BRITISH HONDURAS

# ANNUAL REPORT

## OF THE

# AGRICULTURAL DEPARTMENT

## FOR THE YEAR

# 1956

COMMONWEALTH MYCOLOGICAL INSTITUTE
1- OCT 1958

*Printing Department—British Honduras.*

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# ANNUAL REPORT OF THE AGRICULTURAL DEPARTMENT FOR THE YEAR 1956

## PART I

The main objectives of policy remained unchanged, except for minor modifications in the light of experience and availability of staff; these are referred to under the appropriate headings.

### WEATHER CONDITIONS

2. Rainfall in the Northern Districts was generally average or slightly below. Elsewhere the year was a wet one—Crique Sarco in the extreme south recording 228.51 inches.

3. Wet conditions prevented land clearing equipment from being utilized at the Mussel Creek Rice Scheme; at this Station 12 inches fell between 30th May and 12th June and prevented the completion of the flood-protection embankments.

4. Serious flooding was reported in Toledo, Stann Creek and Belize Districts in early July, resulting in some losses of crops and property. Losses were particularly heavy in the Sittee River and Sibun River areas.

5. Details of Rainfall, Pressure, Temperature and Humidity Records are shown in Appendix 1.

### CROPS

6. *Citrus.* 233,684 boxes (90 lbs. each) of grapefruit and 156,193 of oranges were harvested during the year. Manufacturing data from the Citrus Company are as follows:—

| | |
|---|---|
| Grapefruit Fresh—Bruce Boxes | 18,122 |
| Grapefruit Sections A/2s—24 | 186,128 |
| Grapefruit Juice A/2s—24 | 18,522 |
| Grapefruit Juice A/10s—6 | 28,442 |
| Grapefruit Juice N/S Barrels 42G | 723 |
| Grapefruit Hicell Barrels 42G. | 244 |
| Grapefruit Concentrate Barrels 42G. | 502 |
| Grapefruit Oil lb. | 2,809 |
| Orange Juice A/2s—24 | 134,971 |
| Orange Juice A/10s—6 | 3,606 |
| Orange Hicell Barrels 42G. | 270 |
| Orange Juice Concentrate Barrels 42G. | 374 |
| Orange Juice Concentrate A/10s—6 | 7,009 |
| Orange Oil lb. | 26,085 |

7. Members of the U.S. Department of Agriculture, investigating the incidence of Mediterranean Fruit Fly in Central America, visited during July. No specimens of the pest were found and the mission kindly left a number of insect traps for continued use by the Citrus Growers Association.

8. Due to the devastation by the 1955 Hurricane, only small amounts of citrus from the Northern Districts were available locally in the Belize Market. Supplies, for this purpose, were obtained from the Stann Creek and Cayo Districts.

9. It is reported that deaths from gummosis in the upper Stann Creek Valley have been considerably reduced as a result of improved management.

10. Expansion of the industry is limited by the terms of the agreement with the U.K. Accordingly, new plantings were confined to some 50 acres.

### SUGAR CANE

11. The total acreage of cane in the Corozal District, including 1,200 planted during the year, is approximately 5,000. The factory operated from 23rd February to 31st April.

Records show that 252 farmers delivered a total of 35,247 tons of cane. Deliveries in 1955 were 21,563 tons. The figure for 1956 would have been considerably higher had it not been for the effect of the hurricane. It is also estimated that some 400 acres were not harvested due to the reluctance of some labour, upset by the hurricane, to work steadily whilst receiving relief rations.

12. Revelant factory statistics are as follows:—

| | |
|---|---|
| Tons Cane, ground .. .. .. .. .. | 35,247 |
| Tons Sugar, made .. .. .. .. .. | 3,510 |
| Molasses gallons .. .. .. .. .. | 200,398 |
| Average grinding rate, tons per hour .. .. | 21.40 |
| Tons cane per ton 96° Sugar .. .. .. .. | 9.92 |
| Tons cane per ton Com. Sugar .. .. .. | 10.04 |
| Average Juice Brix .. .. .. .. .. | 19.50 |
| Average Juice Sucrose .. .. .. .. .. | 16.68 |
| Average Juice Purity .. .. .. .. .. | 85.53 |

It should be noted that only 14,771 gallons of molasses were sold; large quantities were run to waste.

13. Severe damage, by Froghopper was reported during August and September in the Louisville and Caledonia areas. Damage appears to have been due to nymphs alone. The Cane Growers Association was advised on measures to effect control.

14. Sugarcane is grown on a minor scale in the Toledo District. Some 42 tons of Muscovado sugar were produced by 3 mills and 5,369 gallons of rum by two distilleries.

15. Experimental work on sugar cane is referred to in Part III.

## COCONUTS

16. The coconut industry has been on the decline for many years. Uncertainty of markets has led to neglect of maintenance with consequent deterioration of holdings; disease is widespread. The only holdings showing improvement are those which have been replanted as part of the Hurricane relief measures. Two large owners, in Ambergris Caye, are taking effective steps to rehabilitate.

17. During 1956 loans totalling $26,801 and grants totalling $16,982 were made.

18. A Secretary to the Coconut Industry Board was appointed in October. He was given a month's course, on attachment, by the Jamaica Board during November. The British Honduras Board has not yet been given executive powers.

## BANANAS AND PLANTAINS

19. The Waha Leaf Company has been making regular shipments, totalling 45,139 stems, to the United States. The plantation was severely affected by Leaf Spot (*Cercospora*) during the dry season; spraying proved effective and the groves soon recovered.

20. Some interest has been aroused in Monkey River, and groves have been established upstream. Fruit, as required, will be delivered to the Company.

21. Plantains have been in good supply for the Belize Market. There has been a small export to Guatemala, Honduras and Mexico. Provided a suitable market can be arranged, plantains would appear to be a more reliable export crop than bananas on account of immunity to Panama Disease.

## PINEAPPLES

22. Growers in the Northern Districts again over-produced for the limited local market. There can be little hope of expansion of this industry in view of existing competition from more highly developed countries.

## CACAO

23. Owing to the fact that no progress was achieved on the entrance road, work at Kendal was confined to maintenance of the old plot and the 400 surviving clones. The Cacao Officer's contract expired in early December and he did not renew it.

24. Encouraged by the interest displayed by the Humming Bird Development Company, which is going forward with its plans for the eventual establishment of some 2,000 acres, there has been a considerable demand for advice and planting material from farmers in the Stann Creek area. Accordingly, a nursery has been established which will supply 30,000 seedlings ordered for 1957. Demonstration plots, showing the importance of shade and other cultural practices, have been established.

25. It became necessary to revise the scheme at Kendal and a new scheme, aimed principally at satisfying demands in the more accessible parts of the Stann Creek and Toledo districts, has been put up for approval by the Secretary of State.

26. Fermentation trials on a small scale, were undertaken in both the Stann Creek and Toledo districts.

27. The suitability of this crop, on certain of the Stann Creek Valley soils, has been amply demonstrated by the excellent growth of a small plantation, some 30 to 35 acres, established by C.D.C. at Alta Vista about 3 years ago.

## RICE

28. In Toledo, the area under rice was estimated at 150 acres. There was excellent weather for preparation and burning of land for B.H. Creole rice, and early rain after sowing produced a bumper crop, of this variety. The heavy rains however did hamper sowing of the next variety, namely, BG 79. However, overall, production for 1956 was excellent, as revealed by purchases made by Marketing Board and others. It should however be borne in mind that at least 50% of the BH Creole rice crop is retained by farmers for their own home consumption, so, with sales of this variety alone reaching a figure of 696,000 lb. it shows that production has gone up considerably over that of previous years. Threshing continued to present difficulties.

### FINAL FIGURES OF PURCHASES OF THE 1956 CROP

| *Marketing Board* | *lb.* |
|---|---|
| At Punta Gorda .. .. .. .. | 1,195,084 |
| At Barranco .. .. .. .. .. | 18,608 |
| At Monkey River .. .. .. .. | 58,000 |
| | 1,271,692 |
| Others .. .. .. .. .. .. | 26,058 |
| | 1,294,750 |

*Comparative figures for the last six years are as follows*: (*lb*).

| 1950 | 1951 | 1952 | 1953 | 1954 | 1955 |
|---|---|---|---|---|---|
| 1,074,396 | 1,143,677 | 726,838 | 640,132 | 617,167 | 1,003,547 |

29. Purchases in the Northern Districts by the Marketing Board amounted to 13,693 lb.; elsewhere, production was negligible.

30. Progress with the pilot mechanised scheme, reported on separately in Part II, was again retarded by unusual weather conditions.

## MAIZE

31. Very good yields were reported from both the Cayo and Toledo districts. Elsewhere, crops were below average. In the Northern Districts seed, amounting to 35,783 lb. was issued free to farmers as part of hurricane relief; the seed was obtained from Jamaica and the U.S.A. as well as from local sources.

32. Floods were particularly damaging to the crop in the Stann Creek District, where some 250 acres were planted. Late yields were affected by germination in the cob due to unseasonal heavy rains. Considerable losses particularly in the north were caused by rats.

33. Purchases by the Marketing Board, were as follows:—

| *District* | *Purchases in lb.* |
|---|---|
| Cayo .. .. .. .. .. | 263,363 |
| Toledo .. .. .. .. | 132,801 |
| Northern .. .. .. .. | 164,027 |
| Belize .. .. .. .. .. | |
| Stann Creek | NIL |

## BEANS

34. Red Kidney yields varied from very good in the Toledo District to poor in the Northern and Stann Creek areas; Cayo recorded a moderate crop, which would have been considerably better but for the relatively high incidence of Anthracnose and other fungus diseases.

25. Purchases by the Marketing Board amounted to:—

| *District* | *Purchases in lb.* |
|---|---|
| Cayo .. .. .. .. .. | 49,326 |
| Toledo .. .. .. .. | 397,370 |
| Northern .. .. .. .. | 901 |
| Stann Creek .. .. .. .. | 28,402 |

36. There is a keen interest in this crop, fostered by the relatively high prices offered by the Marketing Board. There appears to be little doubt that the practice of growing beans on the same land, for more than two years, increases the chance of disease.

## ROOT CROPS

37. Root crops, such as yam, cassava and cocoyam, are mainly grown by the Caribs in the Stann Creek area. Recently, the Department has had some success in fostering increased production in parts of the Cayo and Toledo districts.

## VEGETABLES

38. The main difficulties are transportation, marketing and lack of cold storage facilities. The comparitively small local market, Belize, can be easily flooded. In addition, many of the finer vegetables cannot be produced economically throughout the year, being limited to the cooler months.

## MISCELLANEOUS

39. The making of brooms from broom corn is limited to the Corozal and Orange Walk Districts. Seed, imported from the U.S.A. as part of hurricane relief work, did not prove as suitable as the variety already being grown. 48 farmers, with Government assistance, formed a cooperative registered as the United Farmer's Club Ltd. 633 dozen brooms, valued at $4,717.73, were purchased by the Marketing Board for local sale through the normal trade channels.

## LIVESTOCK

40. Apart from the hurricane devastated areas of the Northern Districts, resulting in a severe shortage of feeding stuffs in the early months, conditions were normal. There were severe isolated outbreaks of Newcastle Disease, which were eventually brought under control by vaccination carried out by dapartmental staff. Fowl typhoid is considered to be the major cause of poultry losses.

## CATTLE

41. A Colonial Development and Welfare Grant of £33,750 was approved in June 1956 to be utilised as follows:

| | | |
|---|---|---|
| Pasture improvement subsidy scheme .. | £30,000 | ($120,000) |
| Improved breeding stock scheme .. .. | £7,500 | ($ 30,000) |
| Revolving scheme for bull improvement .. | £1,250 | ($ 5,000) |

42. *The Pasture Improvement Scheme* subsidises approved work such as fencing, clearing, stumping, planting improved grasses and water supply. Subsidy rates are between 75% and 50% of expenditure with an upper limit of $30 subsidy per acre. Applications by the closing date (31st August) far exceeded the sum available and 153 were finally approved. Subsidies to the end of 1956 amounted to $18,287.74, It is expected that most of the land preparation will be in the dry weather of early 1957, followed by grass planting before the summer rains. Much preparatory work, particularly fencing, can already be seen throughout the country.

43. *The Improved Breeding Stock Scheme* was fully subscribed, nineteen farmers planning to import cattle to improve their existing herds. Subsidy for this scheme was limited to 50% of landed costs, with a maximum subsidy of $3,000 per farmer. Although some applicants have been satisfied to import only bulls, it is gratifying to see that a number of farmers are looking further to the future and importing both male and female stock, so that in time to come good pedigree animals will be bred locally. Five farmers had already made their importations by the end of 1956.

44. Trials with Pangola Grass (*Digitaria decumbens*) have proved successful in most soils throughout the country and this grass shows great promise. It is being rapidly multiplied by the Department and distributed.

45. At the main slaughter houses, 3,728 head of cattle, including 1,793 females were killed. It is reported that the average carcass weight was 224 lb. only.

## PIGS

46. Shipments of pigs from Toledo to Belize, 1,094 in 1956 as compared with 1,830 in 1955, further declined on account of poor maize crops in preceding years. However, in view of the excellent maize crop in 1956, production is on the increase and shipments are expected to return to normal in 1957.

## POULTRY

47. The keeping of poultry is on the increase; successful results have been obtained by a few farmers who maintain relatively large flocks. High protein concentrates cannot, as yet, be obtained locally and have to be imported. With good management and feed, and use of the facilities for vaccination offered by the Department, the industry can considerably expand.

## MARKETING AND AGRICULTURAL LOANS

48. The Marketing Board continued to offer guaranteed prices for rice, maize and beans and, in certain instances, advanced R.K. Bean seed for planting; crop loans for other purposes were discontinued. A great deal of the field work still devolves on the staff of this Department.

49. The Agricultural Credits Fund continued to function. This fund, financed through D & W assistance, is managed by a Committee of which the Director of Agriculture is a member.

50. At the end of 1956 the position of the fund was as follows:—

| | |
|---|---|
| Capital .. .. .. .. .. | $450,000.00 |
| Out on Loan .. .. .. .. | 260,743.21 |
| Loans approved but not yet issued .. | 40,926.00 |
| Loans recommended and awaiting decision by Marketing Board .. .. | — |
| Uncommitted balance .. .. .. | 148,330.79 |

51. All of the field work of the Committee is undertaken by this Department.

## PRODUCER ASSOCIATIONS AND FARMERS GROUPS

52. The Sugar Cane, Livestock and Citrus Grower's Associations still continue to function. The Stann Creek Agriculrural Development Association has shown a keen interest in Cocoa and 30,000 seedlings are being produced by the Department for 33 members.

53. Communal groups at Guinea Grass, San Narciso and other localities in the Northern Districts were active. Assisted by the Department, 73 acres were prepared and planted at Guineas Grass and 50 at San Narciso. Work on 5 Communal piggeries in this area continued.

# PART II

# WORK OF THE DEPARTMENT

### STAFF

54. Mr. V. E. Vial, who had served for some 2½ years as Experimental Officer, resigned in February. No replacement has, as yet, been possible.

Mr. G. Wanrooy, Tobacco Officer, did not renew his contract after proceeding on leave in May.

Mr. J. W. D. Goodban, O.B.E., proceeded to the U.K. on vacation leave in June. While on leave, he was transferred to Sierra Leone as Director.

Mr. G. La Grenade, Cacao Officer, proceeded on leave in December; he did not renew his contract.

Mr. A. N. C. Thomas, late Senior Agricultural Officer Eastern Nigeria, arrived in March to fill the vacant post of Senior Agricultural Officer. He acted as Director during the absence of Mr. Goodban.

Mr. C. A. S. Hynam, Agricultural Education Officer, returned from vacation leave in the U.K. in May.

Mr. S. J. A. Williams, Agricultural Officer, was on vacation leave from May to December.

Mr. R. S. Pitt, Agricultural Officer, arrived on first appointment in November.

## OVERSEAS TRAINING COURSES

55. Mr. C. A. S. Hynam visited Farm Institutes and other educational institutions in the U.K. He was attached to the Department of Education, U.C.W.I., commencing a survey of Agricultural Education in the B.W.I., for 2 months. During this period a visit was also made to Puerto Rico to study work being undertaken there.

56. Farm Demonstrators J. A. Lizama and N. L. Williams successfully completed a one year course at E.C.F.I. and returned during the year. Before his return, Mr. Williams had a further course, of 3 months duration, studying cacao production in Grenada and St. Lucia.

57. Mr. F. F. Orio, Assistant Agricultural Officer, had a six months Extension course in the U.S.A. through the good offices of the U.S. Government; he returned in August

58. Messrs. E. F. and A. P. Bautista proceeded to Trinidad in July for a one year course at E.C.F.I.

## CONFERENCES

59. The Director and the Veterinary Officer attended the 4th Meeting of the British Caribbean Advisory Council on Agriculture and Animal Health in St. Vincent in April.

## AGRICULTURAL EDUCATION

60. *Courses* A total of 39 trainees—6 school teachers, 10 farmers and 23 members of the Staff of the Agricultural Department—attended courses at the Training Centre during the last 7 months of the year.

61. *Course for Primary School Teachers.* The third course for School teachers since the Hostel opened in October 1953 was held from June 25th to August 25th. It was the first for Teachers in Training from the Government Training College and St. John's College. It was opened by the Acting Director of Education. Also present as Guest Speakers were the Principal of the Government Teachers Training College, Miss C. Angier, and the District Commissioner Cayo, Mr. J. Meighan.

The objects of the Course were—

1. To give teachers some understanding of the problems of Agriculture and Forestry in British Honduras and indicate how they can help in programmes of Development.
2. To introduce them to the practices and theory of gardening and its relation to health and the economy of the home.

Six teachers attended—3 from St. John's College and 3 from the Government Training College. Ages varied from 21—27 with an average of 24. The individual Practical Work varied from good to fair only. In the written test marks ranged, out of a total of 100, from 78 to 57 with an average of 66.

62. Following this course 2 of the teachers were posted to the Corozal District, 2 to Toledo and 1 to Succotz. One, who had previously been selected for a Government Agricultural Scholarship and had started working at Central Farm continued his training there.

63. *Course for Farmers.* The second Course, since October 1953, designed especially for practising farmers was held from October 1st to November 30th.

The 10 who attended were from Corozal, Punta Gorda, Louisville, Orange Walk, Burrel Boom, San Antonio Cayo and Monkey River. 4 were Spanish, 3 Mayan, 1 East Indian and 2 Creole. Their ages varied from 33 to 16 with an average of 20.

In addition to introducing trainees to elementary scientific agricultural principles and practices, the more important crops grown in British Honduras were dealt with. The course was designed to provide a foundation on which the District Extension Staff can build.

64. In the courses mentioned above, the Agricultural Education Officer was assisted by the members of the Agricultural Department's Staff, by the Conservator of Forests and members of his Staff, the Registrar of Cooperatives and his Staff, the Acting Marketing Officer and the Home Economics Instructor.

The Department is also indebted to the Guest Speakers who gave extra-curricular talks to students, mostly in the evenings.

In both Courses more than half the time was spent on outdoor practical work.

65. *District Work.* Between courses the Agricultural Education Officer visited the Districts, interviewed applicants for training on their own farms whenever possible, and made final selections in consultation with District Officers.

66. *Staff Training Course.* This, the first of its kind, was held from December 18—20th inclusive by the Acting Director of Agriculture, assisted by other members of the Headquarter's Staff and Mr. C. A Gabb, Stock Verifier. 23 Staff members attended.

The various phases of the new system of administrative and accounting procedure were explained. Mr. D. Romney, Agricultural Chemist, conducted officers over the new laboratory and administration block and described the use to which the various sections would be put. Mr. Gabb dealt with store-keeping and accounting and the writing off of condemned stores.

Full discussion was encouraged during the Course as a result of which agreement on a number of points of Departmental interest was reached and, where necessary, directives issued by the Acting Director.

## EXTENSION WORK

67. Extension work covers a multitude of duties including the provision of improved planting material, land inspections for loan applications and location tickets, veterinary services, control of pests and diseases and advice on all aspects of farming.

68. There can be little doubt that recent increase in production in the Toledo District has been largely due to extension work.

69. The Hurricane Rehabilitation programme has put additional pressure on members of the extension staff.

70. 91 Location Ticket inspections were undertaken during the year, 56 of which were recommended for grant of title, 31 for extension of time and 4 for cancellation.

71. Ploughing and cultivation were undertaken in the Districts on farmers' lands by departmental tractors and equipment.

## DISTRICT AGRICULTURAL STATIONS

72. *Orange Walk.* A pure-bred Berkshire boar was obtained from Central Farm during August. The Red Poll bull gave 7 services during the year. The Jack Donkey was more useful and served 44 mares during the period; his first foal was thrown on 22nd September.

73. Work on sugarcane and grasses continued at this station for demonstration purposes and as a source of planting material for farmers. An acre of pigeon peas was planted and a reasonable stand obtained; it is intended to encourage the use of this crop in the district.

74. *Stann Creek.* This station is becoming increasingly popular with farmers. The following fruit trees were distributed during the year:—

| | |
|---|---|
| Mango .. .. | 498 |
| Cocoa .. .. | 855 |
| Misc. .. .. | 200 |

A further 3,000 citrus are ready for issue in early 1957. An additional 12,000 sour orange seedlings were grown for budding to supply a demand of 10,000 plants for the Citrus Growers Association.

75. 3 semi-permanent sheds, each capable of holding 13,000 seedlings, were erected for cocoa nursery work; water was laid on to each shed. Seed was obtained from Trinidad and from local sources and propagation work begun.

76. A two acre cocoa demonstration plot thrived, except in a few places where shade was too thin. Some of the trees, planted in late 1954, bore pods for the first time.

77. Pasture trials indicated that Pangola is very suited for the area. Two new fields, totalling 7.5 acres, were established and from these planting material was supplied to farmers. Demand for material is steadily increasing.

78. Inclement weather caused a poor maize crop, as was also the case throughout the district. Yams, cassava and cocoyam did well and planting material was distributed.

79. The station herd of cattle did well. There were 16 births, four deaths and sales of 1 cow and two bull calves. There were 34 animals in the herd by the end of the year.

80. Pigs did not do too well, probably on account of the unusually wet and humid conditions. The Berkshire boar died from chronic arthritis.

81. *Punta Gorda.* Heavy rains in June to September caused flooding which adversely affected the yields of crops. Root crops, particularly, gave lower yields than in 1955.

82. The coffee seedlings made good growth under *Cassia alata* and pigeon pea shade. Cacao seedlings also made good growth, especially those protected from the wind.

83. Pangola, although reported not to tolerate high rainfall, was very satisfactory in a new pasture. Results from Jaragua and Guinea were also satisfactory.

84. The Brahmin Bull gave 19 services the year. The Berkshire Boar served 14 sows including one from across the Rio Grande.

85. The following seeds and planting material were distributed.

647 packets of vegetable seeds

37 dwarf coconuts

13 orane seedlings

86. Two sliding roof cacao drying sheds were erected, as well as a small fermentation unit. Samples of local cacao were purchased and fermentation trials carried out.

87. 30 Caribs and their wives attended a Field Day at the station; reports indicate that they both enjoyed, and benefited from their visit.

88. *Baking Pot Experimental Farm.* An extensive programme of drainage was embarked upon the main 56 acre arable block. Drains were dug by hand after marking out with a D4 tractor. When drainage was completed, little or no water was left standing in any of the fields even after the heaviest rains. The cost of these drainage operations proved to be in the vicinity of $80 per acre, and did not obviate the necessity for contour ridges on the steeper slopes.

89. 18 acres of corn were planted of which 2 acres failed as a result of water-logging. Yields were low as the spacing was too close.

90. 6 acres of Black Eye Beans were planted. Germination was excellent but eventually the crop was smothered by weeds. Yields were 100 lb. shelled beans per acre. A further 4 acres were planted too late and were a complete failure.

91. 18 acres of Pigeon Peas were grown experimentally as a cover crop and gave an excellent stand for this purpose. A further 8 acres were planted in November, at wider spacing, for the peas which they would yield. Good results are being obtained although more weeding was necessary.

92. 32 acres of R.K. Beans were harvested in February giving a low yield of 375 lb. per acre; 11,298 lb. of good quality, were sold to the Marketing Board.

93. 10½ acres of ground provisions were planted. Growth of yams, cassava and cocoyams was good but pumpkins were a failure.

94. 6 acres were planted with a mixture of sorghum and kudzu at a rate of 30 lb. and 3 lb. per acre respectively. The sorghum quickly choked out the kudzu and gave an excellent stand. It was cut twice for silage. 1,980 lb. of seed were harvested.

95. 6 acres of pastures sown to Guinea Grass at 20 lb. per acre, had to be oversown with pigeon peas due to low germination. No further acreages were planted with grass during the year but the ½ acre plot of Pangola, established in 1955, did well and served as a source of planting material for all districts.

96. 8.24 acres of cotton were grown experimentally, using 15 different varieties. Average yields were 472 lb. per acre, the highest being Gin 7. The Ginning out-turn averaged 29.2 and there was 57.8% stained. The high cost of labour ruled out cotton as an economic crop.

97. Issues of planting material were:—

| | |
|---|---|
| Citrus .. .. .. .. .. | 215 |
| Avocado pear .. .. .. .. | 101 |
| Grafted Mango .. .. .. .. | 4 |

Sales from the vegetable garden, including ornamental plants, amounted to $582.11

98. 5 new junior quarters were completed during the year. A temporary water supply, replacing the existing one, was installed in August by adapting irrigation equipment. The electricity supply functioned satisfactorily throughout the year.

99. An experienced Equipment Overseer, of a grade corresponding to Assistant Agricultural Officer, was recruited in July. He has undertaken extensive reorganization of maintenance and repair facilities with gratifying results.

100. In the dairy herd, 13 cows yielded an average of 4,042 lb. milk with an average lactation of 253 days.

Sales of dairy produce were:—

| | |
|---|---|
| Milk .. .. .. .. | 172 gallons |
| Cream .. .. .. .. | 1 gallon |
| Butter .. .. .. .. | 285 lb. |
| Skim milk (fed to pigs) .. .. | 958 gallons |

At the end of the year, the herd consisted of 1 Hope Jersey Bull, 22 cows and followers, including 4 young bulls and 7 bull calves. Two half bred bulls were distributed during the year.

101. The beef herd, at the end of the year, consisted of 40 animals; these were 2 bulls, 13 cows, 4 heifers, 4 young bulls, 8 bull calves, and 9 steers. 2 bulls were issued to farmers during the year.

102. The Berkshire pigs, imported from the United Kingdom, do not appear to have adapted themselves to local conditions. Sterility both among boars and pigs, has been evident. Replacements are being obtained from Jamaica, where the breed has become suited to the environment.

103. The pig programme was upset by a total of 60 sows and gilts, from the Northern Districts, being received in January and February. On account of a shortage of food in the North as a result of the hurricane, farmers could not maintain their pigs. The ones brought to Central Farm, of mixed local origin, were intended as a foundation herd for the 6 communal piggeries being constructed as part of the rehabilitation programme. It was proposed that the sows and gilts be served by the Berkshire Boar and returned in 3 months. In the event these plans did not materialize. The piggeries were not completed and there were insufficient foodstuffs grown. As a result, the animals were maintained at Central Farm, at considerable cost, for the whole year. A total of 144 pigs were sold during the year and stock on hand at 31st December was 104.

104. 2 rams and 4 ewes were imported from Barbados in October 1955. The flock now consists of 14, 3 young rams having been distributed and 5 lambs having died.

## TRIALS AND EXPERIMENTAL WORK

105. The Experimental Officer, Mr. V. E. Vial, left the country on the 25th February, 1956. Since that date, experimental work has been continued by the Agricultural Chemist.

106. The general tendency in the districts has been to concentrate on the major crops, particularly cash crops, *e.g.* sugarcane, coconuts citrus, pasture. Some difficulty has been experienced in finding cooperative farmers whose standard of husbandry was high enough to allow experimental treatment to show an effect.

107. Livestock feeding trials have been curtailed and studies limited to collection of data on the productivity of both local stock and pure bred imported animals.

108. An experimental station has been set up at Xaibe, in Corozal District, to study the growth and yields of various crops on the phosphate—deficient, shallow soils of that area.

109. Several new crops have been tried at Central Farm *viz.*, velvet beans, buffel grass, blue panic grass, forage sorghum, various corn introductions, Rhodes grass,

110. It has been observed in all districts that poor crop growth is more often due to bad drainage than to any other single growth factor.

111. Details of the Experimental results of all trials are given in Part III; all information of value resulting from this work is condensed and issued to the Department's staff and farmers in the form of a series of cyclostyled information sheets.

112. *Tobacco.* The Tobacco Officer left the country on 30th May and did not return. Work is being continued, at a reduced level, under the general guidance of the Agricultural Chemist and the Agricultural Officer Northern Districts.

113. The 1956 crop was the third one after clearing from forest. The original burning was somewhat uneven, especially since on some parts of the land the bush had been heaped. This resulted in variations in both yield and quality in the first two crops, but these variations were no longer noticeable in the 1956 crop.

114. The soil on the research station is a sandy loam 12—15" deep underlain by a sharply-defined, sticky, mottled, sandy clay subsoil. The land is flat with a very slight slope towards the north, but in addition there are isolated patches 5—15 yards across in which drainage is impeded because of depressions in both the topsoil and subsoil. Poor growth in these badly-drained patches still showed in the 1956 crop despite some levelling work.

115. The high N content of the virgin Pixoy sandy loam, and the slow release of this nitrogen, is still causing too vigorous growth and high nicotine content, but there has been a steady improvement in quality each year. However, even in the third year, the soil is still far from equilibrium.

Transplanting was done as follows:

| | |
|---|---|
| Acre 2, 3, 5 & 6 & fertilizer trial .. | 2—5/1/56 |
| Acre 1 .. .. .. .. .. | 16—17/1/56 |
| Acre 4 .. .. .. .. .. | 18—19/1/56 |

116. All plants received 20 gms. (3/4 oz.) potassium sulphate and 20 gms. triple superphosphate each. This is roughly equivalent to 200 lb. of each per acre. The land preparation was done late, whence the seed-bed was not as weed-free nor as consolidated as it might have been. This accentuated the heavy drought which followed. Considerable money was spent watering plants and it was resolved to plant 2—4 weeks earlier the following year.

Axil suckers formed early and suckering, to ensure even ripening of leaves on the main stem, began on 15/12/56. Some plants developed edge and tip necrosis of the leaves. This was due partly to drought, partly to K deficiency, and later on to mematodes.

117. Curing, which began on 19/3/56, was difficult, because, in order to fill the barn, tobaccos of different ages and cultivation histories had to be cured at one time. Curing data indicate, however, that 80% of bright leaf is obtainable with a uniform barn filling.

118. A number of crops were tried during the off-season. General indications are (*a*) the yield of tobacco after a legume crop is higher than that following sweet potatoes, partly due to N residues after the legume but mainly due to the K deficiency induced by the excessive uptake by *Ipomoea* spp.

(*b*) Tobacco following sweet potato is of low quality due to leaf damage as a result of K deficiency.

(*c*) Tobacco yields and quality after sorghum and corn were very satisfactory.

(*d*) Legume crops did not appreciably increase the nicotine content of the succeeding tobacco crop.

119. A fertilizer trial with 12 treatments and 6 replications in its first year indicated a decrease in necrosis as a result of K application but none of the decreases were satistically significant at the $p = 0.05$ level. Yields were not affected by the treatments. Treatment effects were somewhat masked by high soil N and by uneven burning after clearing.

120. Two small areas were treated with 200 gms. potassium sulphate per plant when the plants were about 18" high (11/2/56). Rain fell the following day. This application (2,000 lb./acre) improved growth and very much decreased the incidence of necrosis, although the plants were still not perfect.

Late topping and no topping were compared with normal topping, but there was no change in the yield of fresh leaves.

121. Total production from the 7 acres was as follows:

| Flue-cured | lb. | lb. |
|---|---|---|
| 1st quality light .. .. .. .. .. | 142 | |
| 1st quality heavy .. .. .. .. .. | 152 | |
| Tips .. .. .. .. .. .. .. | 246 | |
| 2nd quality .. .. .. .. .. .. | 272 | |
| 3rd Quality light .. .. .. .. .. | 346 | |
| 4th Quality .. .. .. .. .. .. | 149 | |
| 3rd & 4th quality (thin leaf) .. .. .. | 236 | |
| 5th Quality .. .. .. .. .. .. | 356 | |
| 5th Quality (thin leaf) .. .. .. .. | 224 | |
| 6th Quality .. .. .. .. .. .. | 326 | |
| Total flue cured .. .. .. .. .. | | 2,449 |
| Air cured .. .. .. .. .. .. | | 3,392 |
| Total .. | | 5,841 |

Average yield 874 lbs./acre.

122. During the remainder of 1956, 4 acres were established in pangola grass as the first stage of rotational farming. A series of off-season crops were grown in preparation for the 1957 tobacco crop. Seedbeds were prepared earlier and all transplanting was done earlier *i.e.* between November 28th. and December 24th. The fertilizer trial is being repeated but, owing to the incidence of potash deficiency symptoms in 1956, potash treatments have been doubled.

123. *Conclusion.* The 1956 crop, which had an average yield of 874 lb./acre, showed a marked improvement in quality, despite drought, nematodes, the difficulty of curing small quantities of leaf, and leaf damage due to potash deficiency. It is hoped that the 1957 crop will show a further improvement in quality.

124. *Rice Pilot Scheme.* Considerable progress was made in development of the land for permanent rice production at both the Dump and Mussel Creek. The clearing and earthwork at the latter, though, were not sufficiently advanced for large scale production during the year. Some 90 acres of the Dump was farmed. Experimental work with rice and grasses was carried out at the Mussel Creek rice station.

125. *Mussel Creek.* The dry season started early in the year following the heavy rains during the fall of 1955. Field operations and bulldozer work were possible on the better drained fields by the middle of January. Showers started in May, and, on the 30th of the month, heavy rains began with 12 inches falling by the 5th of June. Rains were then well distributed throughout the remainder of the year with no unusually heavy downpours. Except for a short period in August, no further landclearing or earthmoving was possible.

126. The water storage reservoir was essentially completed. At the end of the year, it held 200 acre-feet of water which was considered the maximum safe storage as the embankment was new and there were some low places. Seepage through the bank is negligible. This method of storing surplus water for use during dry periods seems promising for this area. Features of the system are:

(*a*) the land on which the reservoir is situated is pine ridge land of little value.

(*b*) These pine ridge soils have an impervious layer under the sandy topsoil.

(*c*) Water can be collected from a sizable area by use of diversion channels.

(*d*) Lower and more productive soils can be watered by gravity from them and

(*e*) water is held back which would otherwise contribute to floods.

127. The greatest amount of time and effort (947 Caterpillar hours) was put on building the reservoir and flood protection embankment around the savannah. Unfortunately, the

latter was not completed before the rains started. A crop planted with hopes that the work would be completed was lost. Only 355 hours were spent on land clearing. Much of this was on bushing so that little land was ready for planting.

128. *The Dump.* Approximately 50 to 60 acres which were partly cleared last year in the Dump were completed, bushed and raked. Of the remaining 40 to 50 acres about half was bushed only and was not farmed. Three quarters of a mile of road was built from the main road to the end of the cleared area. Between the 100 acre block and the main road about 35 acres, which had been farmed previously and had grown up in grass and reeds, were raked free of logs and stumps.

129. *Field Work.* As stated, no large scale production was possible at Mussel Creek during the year. The 63.5 acres of rice planted on the Savannah was abondoned after failure to complete the flood embankment. Data collected on the time and fuel required for various operations are tabulated below.

| | | *Gasoline Cost at 35¢ per gallon* | | | |
|---|---|---|---|---|---|
| *Land Preparation* | *Hours* | *Gasoline* | *Total* | *Per Acre* | |
| | | *U.S. Gal.* | | | |
| Plowing | 113 | 260 | $91.00 | $1.43 | |
| Disking and harrowing | 121 | 242 | 84.70 | 1.33 | |
| Land Levelling | 51 | 117 | 40.90 | 0.65 | |
| Planting and fertilizing | 19 | 19 | 6.65 | 0.10 | |
| Marking bunds | 11 | 11 | | | |
| Building bunds | 14 | 32 | | | |
| Butting bunds | 4 | 4 | 16.45 | 0.26 | 3.77 |
| *Irrigation* | | | | | |
| Flushing for germination | 96 | 192 | 67.20 | 1.06 | |
| First flooding | 150 | 300 | 105.00 | 1.65 | 2.71 |

Total fuel cost per acre until rains start for April 20th planted crop: $6.48.

130. It had been intended to plant in August the high bush field cleared the year before. However, a fair volunteer crop developed so this was allowed to mature and was harvested. It is now planned to plant the field in the spring of 1957 using water stored in the reservoir until the rains start.

131. *Experimental Work.* Limited varietal trials of imported and local rices were tried on both pine ridge and high bush soils. Because of bird damage it was difficult to obtain conclusive data on the latter. Indications are that superior varieties for August or September planting on either soils are Bluebonnet 50, century Patna 231 and British Honduras Creole. Others tested, which did not do well at this time of year, were Kamrose, Cody, Caloro, Calrose Blue Rose, Zenith, Arkrose, Lacross, Magnolia, Colusa, Toro, Sunbonnet and British Guiana 79. The reason that many of these did poorly is that the short days caused them to mature too early.

132. Yields of pine ridge plots grown under upland conditions were very low. A test harvested in January 1957 gave these results.

| | |
|---|---|
| Bluebonnet 50 | 441 lb./acre |
| Century Patna 231 | 381 |
| B.H. Creole | 340 |
| Zenith | 275 |
| Sunbonnet | 170 |
| Toro | 107 |

These are for plots which received 40 lbs. P205 per acre. There was no response from other fertilizer elements as shown below.

| | |
|---|---|
| No P .. .. .. .. .. .. | None lb./acre |
| P .. .. .. .. .. .. | 388 |
| NP .. .. .. .. .. .. | 320 |
| PK .. .. .. .. .. .. | 257 |
| P Lime .. .. .. .. .. .. | 249 |
| NPK .. .. .. .. .. .. | 347 |
| NPK Lime .. .. .. .. .. | 282 |

(Average yields of three best varieties; P—40 lb. P205/acre; N—40 lb. N/acre; K—40 lb K20/acre; Lime—2000 lb./acre)

133. Trials of the following grasses and clovers were made on high bush and pine ridge soils with a December 1955 planting; Oats, Rye grass, Kentucky 31 Fescue, Dallis grass, Alta Fescue, Sweet grass, White clover, Subterranean clover, Louisiana white clover, Bur clover, Louisiana S—1 white clover, Dixie crimson clover, Alsike clover and Hubam. From among the clovers the best growth was made by La. S-1, Crimson, Subterranean, La. Red and Alsike. However, none on the pine ridge lived through the dry season and none came up from seed later. Some persisted on the high bush soil but have largely been crowded out by weeds. Dallis was the only grass from this test which made a good showing, and it continued to grow well. There was no response to any fertilizer on the high bush soil, but the clovers showed a strong response to lime and phosphate on the pine ridge.

134. A trial of Para, Pangola, Guinea, Jaragua and Pensacola Bahia grasses was put out on the pine ridge on 27th July. The first two made much better growth as compared with the latter three. Their response to fertilizer is indicated by the amounts of grass clipped on 10th October.

| | NPK | NPKL | NP | NPL | PK | PKL | P | PL | CHECK |
|---|---|---|---|---|---|---|---|---|---|
| Para .. | 7,530 | 5,450 | 6,840 | 5,390 | 3,670 | 3,500 | 2,870 | 2,710 | 1,590 |
| Pangola .. | 5,490 | 3,640 | 5,200 | 2,700 | 1,640 | 1,640 | 1,190 | 1,590 | 480 |

(Pounds green matter per acre; N—40 lb. N/acre; P40 lb. P205 per acre; K—40 lb. K20 per acre; L—2,000 lb. lime/acre).

135. Another test of Pangola with different planting rates and different levels of phosphate gave these results.

| *Planting rate* | 27 *lb. P205* | 40 *lb. P205* | 80 *lb. P205* | *Average* |
|---|---|---|---|---|
| *Lb. per acre (green fodder)* | | | | |
| 504 | 665 | 1,825 | 2,605 | 1,698 |
| 892 | 1,155 | 1,770 | 3,185 | 2,037 |
| 1,421 | 735 | 1,685 | 3,900 | 2,107 |
| Average | 854 | 1,760 | 3,230 | |

(all plots received 40 lb. N; fertilized 27th September, clipped 6th December.)

136. This work on the pine ridge, and further tests not completed, indicate that pastures will require phosphate and nitrogen at regular intervals. Neither lime nor potash are of any benefit. Promising grasses are Dallis, Para and Pangola.

137. Pasture trials have been undertaken because the pine ridge soils at the station have proved unsuitable for rice on a large scale. Because of the dense subsoil, the topsoil remains saturated with water much of the year, particularly in depressions. During this time, neither wheel nor track-laying tractors can operate without becoming bogged. This fact, together with the low fertility indicated above, has made us look for other uses of this soil which covers quite an area of the country.

138. *Rice Paddy Grades and Prices.* The Rice Officer recommended to the Marketing Board that for 1957 the guaranteed price for rice (paddy or rough rice) should be based upon the quality of the rice. A simple grading system with increased prices for the better grades, as shown below, was suggested.

| *Grade* | *Maximum amt. of foreign material+* | *Rate per 100 lb. delivered Belize* |
|---|---|---|
| I | 5% | $7.00 |
| II | 10% | 6.00 |
| III | 15% | 5.00 |
| IV | 25% | 4.00 |

+Foreign material is to include husks, blighted grains, discoloured grains RED RICE, and rice of contrasting grain types.

*Deduction for Fxcess Moisture*

| 15.0 or less .. .. | 15.1—17.0 | 17.1—19.0 | 19.1—21.0 | 21.1—23.0 | 23.1—25.0 |
|---|---|---|---|---|---|
| None .. .. | $.35 | $.65 | $.95 | $1.25 | $1.55 |

## AGRICULTURAL CHEMIST'S REPORT

139. Since February 1956, the Agricultural Chemist has performed the duties of Experimental Officer in addition to his own. From May until the end of the year he also acted as Agricultural Officer for the Northern Districts and as Tobacco Officer.

140. In the course of rehabilitation after Hurricane Janet, 104 damaged cocoanut plantations totalling 1,500 acres were soil-surveyed to ascertain the extent of their suitability for coconuts. Soil sketch maps were prepared in many instances to guide the farmer, or the farmer was assisted to find a more suitable site in which to invest rehabilitation money.

141. Further work was done, with the small supplies on hand of sodium chlorate and dimethyl urea, to kill the scattered patches of Johnson grass (*Sorghum halepense*) in the Corozal area. This noxious weed is now more or less localised in the old Agricultural Station and further attempts will be made to eradicate it there.

142. A simple trial was laid down at Orange Walk Agricultural Station in an attempt to eradicate nut-grass (*cyperus rotundus*). On garden plots 15 yards long by 1 yard wide, unreplicated treatments were applied as follows:—

| | |
|---|---|
| A .. .. .. .. .. | 5 lb/acre Karmex W (CMU) |
| B .. .. .. .. .. | 40 lb/acre „ |
| C .. .. .. .. .. | 40 lb/acre „ |

The application was made at the beginning of the dry season. Half of each plot was heavily watered for several days. The soil is a deep, sticky, sandy clay. Up to December nothing grew on the beds, except for one or two very yellow and sickly-looking nut-grass plants: possibly the dimethylurea had been partly leached from the surface. The concentration was, however, still too great to allow any vegetables to be grown or any plot. It appears that adequate nut-grass control may be possible by using two applications, at 4 month intervals, of 3 lb./acre dimethylurea.

143. The main survey work has been at Kendal and Fig Tree Camp on Sittee River. Here 4,000 acres were mapped in detail. A total of 20 soil types were recognised, mainly various phases of the four terraces of Sittee River. Of these types, eleven were considered to be suitable for cacao, four of marginal suitability for cacao and five quite unsuitable.

144. Accurate levels have been taken on sixty-five acres at Central Farm as a basis for a drainage system. Levels have also been taken on 120 acres at Guinea Grass Communal Farm and 120 acres at San Narciso Communal Farm to determine the line of the main drains.

145. The Agricultural Chemist was a member of the 10-man Advisory Team headed by Mr. A. de K. Frampton, C.M.G. After working with the team for two weeks during May, he contributed a section of the report.

146. A total of 153 days were spent away from Central Farm, comprising 37 trips. Numerous visits were made to farms, including the Prison Farm, in an advisory capacity.

147. Seven days in all were occupied lecturing at the Training Hostel on soils, Land use and Crop Rotations. Two film shows were also given. Six Information Sheets were written in the course of the year.

148. During the second half of the year, considerable time was spent in supervising and advising building and installational work in the now-completed Laboratory and Research Block. Almost all the equipment had arrived by the end of the year, was unpacked, checked and installed.

149. The staff, records and equipment of both Agricultural Chemist and Experimental Officer were moved into the new buildings and reorganised.

150. The compilation of meteorological records is handled by the Agricultural Chemist's staff. There are now 48 rainfall recording stations, six of which have been started during 1956. The three District Agricultural Stations and Central Farm are small meteorological centres, possessing wet and dry bulb thermometers, anemometers, thermohygrograph, recording raingauge, maximum and minimum thermometers, evaporimeters and in some instances, earth thermometers and barographs.

## VETERINARY OFFICER'S REPORT

151. The Animal Disease Survey, initiated in 1954 as a minor economic scheme, was completed and published in December 1956.

### Horsekind

152. *Glanders* has been suspected in the past from time to time. 340 equines (15% of estimated population) have been tested for glanders during the year by the intrapalpebral mellein test, with negative results.

### Cattle

153. *Vesicular Stomatitis* has again been encountered on a number of properties in Cayo District. This disease must now be considered enzootic in this area, and is limited in the main to young stock, the older animals presumably having previously gained immunity.

154. Tick Fever due to Babesia bigemina was seen on only one occasion, in a pure-bred Aberdeen Angus bull, imported from the U.S.A. about three weeks previously. The few diagnosed cases of piroplasmosis in recent years have all been in temperate breed cattle recently imported from tick fever free areas. The risk of such importations is not fully appreciated by members of the public.

155. *Infective Warts* are prevalent in British Honduras, particularly on cattle under three years of age. Normally warts show little indication of spontaneous recovery, cause general debility and frequently secondary infection or fly strike causes the death of the animal. Lithium antimony thiosulphate 6% solution (Anthiomaline May and Baker) is the only treatment which has shown promising results. Three subcutaneous injections of 15 c.c.s are given at ten to fourteen day intervals. Records were kept of the treatment of 32 cases. A complete cure resulted in 23 cases (72%). In successful cases, the warts invariably started to fall off between the second and third injection, a period of up to one month elapsing before the process is complete.

### Swine

156. *Swine Fever.* Two complete years have now elapsed since the last suspected case of swine fever occurred in the Northern Districts. All restrictions were removed on 24th February and the country may now be considered officially free of the disease.

### Poultry

157. *Fowl Typhoid* is considered enzootic and is the major cause of poultry losses in the country. A small survey was made to assess the degree of infection in typical village flocks. 526 birds were blood-tested on 24 properties using pullorum-gallinarum stained antigen. 96 birds (18.3%) reacted, only 8 flocks (33%) were free from reactors.

158. Furazolidone has shown great promise as a feed additive, for prevention in flocks where typhoid is known to occur annually and for checking the spread within a flock already suffering losses.

159. *Fowl Pox* (locally known as "yaws") is also enzootic throughout the colony. Mortality in young chicks and turkeys is considerable.

160. *Newcastle disease*, as mentioned in the 1955 Annual Report, made its appearance in Belize in December 1955. Movement restrictions were immediately imposed but, despite controls, secondary outbreaks, all directly traced to birds moved out of the primary infected

area, occurred at Maskall, Stann Creek and Mango Creek. Extensive vaccination, using a live intra-ocular vaccine, was undertaken around, and later within infected areas and in other areas of dense poultry population. In all, 25,000 birds were vaccinated free of charge to the owners, about the fifth of the poultry population of the colony. Effective control of the outbreaks resulted and all restrictions were removed on 8th June. These outbreaks were characterised by the extreme virulence of the disease. Once a flock was infected morbidity and mortality within the flock invariably exceeded 95%. At the villages of Maskall North and Mango Creek, mortality was literally 100%. It is considered that two thirds of the fowls in Belize City died within two months.

### Legislation

161. S.I. 1 of 56 Poultry (Declaration of Animals) Order 1956
2 of 56 Declaration of Diseases (animals) Order 1956
3 of 56 Poultry Diseases (infected Places) Order 1956
6 of 56 Foreign Animals (Importation) (Amendment) Control Regulations 1956
9 of 56 Foreign Animals (Importation) (Amendment No. 2) Control Regulations 1956
10 of 56 Poultry Diseases (Infected Places) Order (No. 2) 1956
11 of 56 Swine Fever (Infected Places) (Revocation) Regulation 1956
16 of 56 Swine Fever (Infected Places) (Revocation) Order 1956
34 of 56 Poultry Diseases (Infected Places) (Revocation) Order 1956
38 of 56 Poultry Diseases (Infected Places) (Revocation) Order (No. 2) 1956
49 of 56 Foreign Animals (Importation) Control (Amendment No. 3) Regulations 1956.

## LAND CLEARING

162. The Land Clearing unit is under the charge of a Land Clearing Engineer. Equipment consists of two D8 Caterpillar Tractors, two D7 Caterpillar tractors, two D4 Caterpillar tractors, two Turner Diesel wheeled tractors and ancillary equipment for cultivation.

163. The two D8's were purchased second-hand and had done a lot of work on road-making before being acquired by the Department. Consequently, they have required considerable repairs and maintenance and have been expensive to operate.

164. The two D7's have proved to be most suitable under local conditions. The two D4's have proved to be suitable for use on light bush or in windrowing and cultivations only. The Turner Diesels have not proved as satisfactory as the Caterpillar tractors.

165. Experience has shown that it is better to concentrate the entire unit rather than work over a large area, with consequent supervision and administrative difficulties.

166. During the year, in addition to clearing land, the unit has worked on embankments and roads. 648 acres were cleared and the total number of tractor hours worked was 2,659. Revenue accruing was $29,670.00. Inclement weather prevented more work being done.

167. Of the ancillary equipment, the Rome Ploughs and the Ransome Harrows have given sterling service.

## COMMITTEES

168. The Director served on the following committees:—

The Marketing Board, the Agricultural Credit Fund, the Roads and Rural Water Supplies sub-committees,

## COMMISSIONS AND VISITORS

169. An Agricultural Advisory team, under the leadership of Mr. A. de K. Frampton C.M.G., visited during May; the report, including recommendations, is awaited.

Messrs. Gilmour and Howes, Economic and Salaries Commissioners respectively, visited during the latter part of the year. There were a large number of visitors, both from oversea and local sources, to Central Farm and district agricultural stations.

ACKNOWLEDGEMENTS

170. The Acting Director wishes to express his appreciation of the way in which the staff have cooperated.

A. N. C. THOMAS,
*Acting Director of Agriculture.*

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# PART III

## RESULTS OF EXPERIMENTS

## TOBACCO

### TABLE 1

Influence of previous crop on incidence of K deficiency

| *Strip No.* | *Previous Crop* | *% plants with K deficiency* |
|---|---|---|
| 11 | Black-eye peas | 0.5 |
| 12 & 13 | Sweet Potato | 18.8 |
| 14 | Soyabeans | 2.1 |
| 15 | Sweet potato | 18.4 |
| 51 | Groundnuts | 1.3 |
| 52 | Sweet potato | 8.5 |
| 53 & 53A | Kudzu | 6.1 |
| 54 | Sweet potato | 25.9 |
| 55 | Soyabeans | 2.9 |
| 56 | Sweet potato | 23.9 |

### TABLE 2

RESULTS OF FERTILIZER TRIAL (*See para.* 119)

| *Treatment* | *No. of necrotic plants/plot* | *total yield over 6 replicates* |
|---|---|---|
| O. .. .. | 16.0+6.5 | 362 |
| P.K. .. .. | 6.5+4.1 | 403 |
| P.2K. .. .. | 7.7+2.9 | 352 |
| P.3K. .. .. | 6.0+5.0 | 396 |
| 2.P.K. .. .. | 8.3+4.1 | 375 |
| 2P.2K. .. .. | 8.0+6.0 | 379 |
| 2P.3K. .. .. | 4.3+3.6 | 377 |
| 3P.K. .. .. | 8.3+5.0 | 372 |
| 3P.2K. .. .. | 6.0+5.0 | 363 |
| 3P.3K. .. . | 5.5+3.7 | 352 |
| N3P.3K. .. | 8.7+3.5 | 387 |
| 2N.3P.3K. .. | 11.0+3.6 | 410 |

O = control
N = 100 lb./acre sulphate of ammonia (21%)
P = 100 lb./acre triple superphosphate y (45%)
K = 100 lb./acre potassium sulphate (45%)

TABLE 3

CHEMICAL ANALYSIS

| *Sample No.* | *Previous crop* | *Chlorides % of D.M.* | *Nicotine % of D.M.* | *Polyphenol and sugars % of D.M.* | *Schmuck's Value* | *Smoke Value* |
|---|---|---|---|---|---|---|
| 1/1955 | corn | 0.78 | 4.32 | 14.3 | | |
| 2/1955 | corn | 0.44 | 7.26 | 6.3 | | |
| 51/1956 | peanuts | 1.61 | 2.48 | 21.5 | 13.5 | —10 |
| 52/1956 | Ipomoea | 1.28 | 2.74 | 21.3 | 14 | — 8 |
| 53/1956 | Kudzu | 0.82 | 2.73 | 19.7 | 12.5 | — 2 |
| 54/1956 | Ipomoea | 1.03 | 2.62 | 18.4 | 13.5 | —10 |
| 55/1956 | Soyabeans | 0.75 | 2.09 | 23.6 | 15 | — 8 |
| 56/1956 | Ipomoea | 1.03 | 2.48 | 21.4 | 15 | — 6 |
| 24A/1956 | corn | 1.07 | 1.61 | 26.3 | 22 | —14 |

From the above it is evident that the quality is much better than in 1955, *viz.* lower nicotine content, increased polyphenol and sugar content, high Schmuck's value, and a low and negative smoke value. Only chloride remains rather high—a factor which has no obvious explanation. Smoking tests pronounce the samples to be mainly of a milk taste, slightly acid. Aroma is generally poor without being unpleasant and burning quality only fair. Sample 24A, grown after corn, is notably better than others. This may be due to its being planted closer than the remainder. Samples from the plots very heavily fertilized with potash were found on analysis to be no better than others with respect to quality; neither was leaf potash content increased.

## PASTURE

(1) *Natural Savanna Pasture*

Further figures are now available on yield, botanical composition and response to fertilizers of natural pasture.

(*A*) *At Central Farm*, the 2—year average of yields in lb./ acre from 1/50 acre plots are:—

TABLE 4

NATURAL SAVANNA PASTURE, CENTRAL FARM, 1955 & 1956

| *Month* \ *Fertiliser* | *C* | *N* | *P* | *2P* | *NP* | *Monthly average* |
|---|---|---|---|---|---|---|
| January .. .. | 688 | 817 | 978 | 1,186 | 929 | 920 |
| February .. .. | 337 | 378 | 767 | 531 | 480 | 499 |
| March .. .. .. | 145 | 172 | 207 | 306 | 410 | 248 |
| April .. .. .. | 35 | 74 | 234 | 254 | 289 | 177 |
| May .. .. .. | 626 | 954 | 870 | 709 | 869 | 806 |
| June .. .. .. | 1,818 | 1,365 | 2,135 | 2,285 | 2,278 | 1,976 |
| July .. .. .. | 1,272 | 1,441 | 1,676 | 1,434 | 1,551 | 1,475 |
| August .. .. | 808 | 651 | 821 | 659 | 703 | 728 |
| September .. .. | 1,403 | 1,195 | 1,583 | 1,370 | 1,521 | 1,414 |
| October .. .. | 922 | 930 | 1,533 | 1,334 | 1,261 | 1,196 |
| November .. .. | 655 | 934 | 411 | 1,945 | 683 | 926 |
| December .. .. | 355 | 353 | 300 | 362 | 295 | 333 |
| Annual Total .. .. | 9,062 | 9,264 | 11,515 | 12,375 | 11,269 | |

C = control
N = 100 lb./ acre suphate of ammonia in May and 100 lb./ acre sulphate of ammonia in November,

P = 100 lb./ acre triple superphosphate in May
2P = 100 lb./ acre application repeated in November

The notable characteristics of these figures are:—

1) Only one quarter of the total annual growth is produced in the 6—month period from December to May inclusive, *viz.*

December—May average monthly yield =497 lb./ acre of D.M.
say 10 cow grazing days *i.e.* 3 acres/cow

June —Nov. average monthly yield =1,268 lb./acre of D.M.
say 25 cow grazing days *i.e.* 2½ acres/cow.

based on 100 lb. fresh material/cow/day at 50% utilization. (average D.M.%=25).

2) Growth in May varies, depending on the exact date of the onset of the rainy season. Almost all measurable growth occurs after the beginning of the rains sometime in the second half of May. The years 1955 and 1956 exhibited two extremes for the date of commencement of the rains for the Cayo District (June 19th and May 18th respectively).

3) The low production in August is due to the "Maugre" season or "little dry".

4) The reduced growth in December is thought to be influenced more by low temperatures and short days than by drought.

5) The response to fertilizers is small and variable.

The theoretical grazing values given above are likely to be much less in practice due to the unsatisfactory botanical composition of the sward, viz.

TABLE 5

NATURAL SAVANNA PASTURE, CENTAL FARM. 1954 to 1956

| | % *composition by weight* | | | | | |
|---|---|---|---|---|---|---|
| | | *GRASSES* | | | *WEEDS* | |
| *Month* | *Axonopus compressus* | *Crab grass* | *Bahama grass* | *Paspalum Centrale* | *Chichebe* | *Others* |
| June 1954 .. | 57 | 0 | 34 | 1 | 3 | 5 |
| July 1954 .. | 41 | 0 | 29 | 3 | 7 | 20 |
| Sept. 1954 .. | 58 | 0 | 7 | 5 | 4 | 26 |
| Nov. 1954 .. | 61 | 0 | 15 | 1 | 12 | 11 |
| Dec. 1954 .. | 52 | 0 | 21 | 1 | 9 | 17 |
| Jan. 1955 .. | 62 | 0 | 10 | 0 | 7 | 21 |
| Mar. 1955 .. | 75 | 0 | 4 | 0 | 11 | 10 |
| Apr. 1955 .. | 22 | 37 | 24 | 0 | 1 | 17 |
| June 1955 .. | 18 | 19 | 21 | 6 | 7 | 29 |
| Aug. 1955 .. | 15 | 7 | 14 | 44 | 0 | 20 |
| Sept. 1955 .. | 11 | 16 | 14 | 42 | 0 | 17 |
| Oct. 1955 .. | 17 | 25 | 0 | 9 | 0 | 49 |
| Nov. 1955 .. | 19 | 5 | 10 | 0 | 28 | 38 |
| Dec. 1955 .. | 0 | 11 | 3 | 5 | 31 | 50 |
| Mar. 1956 .. | 30 | 0 | 1 | 0 | 44 | 25 |

*Axonopus Compressus*—Main graminaceous component of the sward, amounting to more than 50% in the first year; in the second year it constituted approximately 20% of the sward, its place being taken by weeds and crab grass.

*Cynodon dactylon* (Bahama grass)—occupies 15—20% of the sward without any noticeable change with season.

*Paspalum centrale*—appears in the rainy season as an important component, but has a very low productivity in the dry season. Much more noticeable in the second year.

*Crab grass* (*Digitaria spp.*)—became much more predominant in the second year, when it amounted to about 20% of the total fresh weight; this increase was partly due to a severe dry season in 1955 which reduced other species.

*Weeds*—The regular cutting allowed the weeds to increase from about 25% of the sward in the first year to more than 50% at the end of the second dry season. Of these weeds, about half were chichebe (broomweed or *Sida acuta*), whilst *Mimosa* spp. were also common.

(*B*) *At Galvez pasture, El Cayo.* Yields from paired plots in lb./ acre were:—

TABLE 6

| *Month* | *Fertilizer* NPL | NL | N | C |
|---|---|---|---|---|
| January 1956 .. .. .. .. | 627 | 862 | 627 | 710 |
| February 1955 & 1956 .. .. | 215 | 328 | 335 | 282 |
| March 1955 & 1956 .. .. .. | 34 | 48 | 46 | 55 |
| April 1955 & 1956 .. .. .. | 0 | 0 | 0 | 0 |
| May 1955 & 1956 .. .. .. | 0 | 0 | 0 | 0 |
| June 1955 & 1956 .. .. .. | 272 | 138 | 155 | 125 |
| July 1955 & 1956 .. .. .. | 1,251 | 963 | 1,385 | 1,026 |
| August 1956 .. .. .. .. | 823 | 789 | 518 | 466 |
| September 1956 .. .. .. | 1,118 | 904 | 981 | 1,058 |
| October 1956 .. .. .. .. | 1,092 | 944 | 1,017 | 1,128 |
| November 1956 .. .. .. | 1,105 | 635 | 706 | 977 |
| December 1956 .. .. .. | 1,301 | 1,910 | 1,902 | 2,156 |
| Total .. .. | 7,838 | 7,521 | 7,672 | 7,983 |

C = control
N = 100 lb./ acre sulphate of ammonia in May and lb./ acre sulphate of ammonia in October.
P = 100 lb./ acre triple superhphosphate in May
L = 1 ton/ acre lime.

The average botanical analysis of this sward was:—

| | |
|---|---|
| Axonopus compressus .. .. .. | 36% by wt. |
| Crab grass (digitaria spp.) .. .. | 19 „ „ |
| *Paspalum centrale* .. .. .. .. | 14 „ „ |
| Setaria geniculata .. .. .. .. | 7 „ „ |
| Chichebe (*Sida acuta*) .. .. .. | 7 „ „ |
| Other weeds .. .. .. .. | 17 „ „ |
| | 100 |

The annual growth curve, botanical composition and poor response to fertilizers is essentially similar to the natural savanna pasture studied at Central Farm (see (1) (*a*).).

On the basis of these figures, and general observations on grazing capacity, it has been concluded that these natural pastures give a very low return for money spent on fencing, bush-hogging, fertilizer and water supplies. Studies in the future will be confined to improved grasses properly planted in pure stands or simple mixtures.

II. *Improved Grasses*:

Useful figures are so far available only for

(*a*) Sweet Grass (*Ixophorus unisetus*): Measurements have been commenced on a 1—year old sweet grass pasture to obtain a production curve for the year with and without simple fertilizer treatments. Plots of 1/200 acre were replicated 4 times in a randomised block. The fertilizer treatments were not laid down until 29th August 1956, but some indication of potential yield and response to fertilizer can be obtained from the figures obtained to date.

TABLE 7

| Date | Age of grass | Average yield D.M. (lb./ acre) | | | | | Average D.M. % |
|---|---|---|---|---|---|---|---|
| | | O | K | N | P | NPK | |
| 29/8/56 .. | fertilized | | | | | | |
| 22/10/56 .. | 8 weeks | 1,507 | 2,644 | 2,294 | 3,497 | 3,158 | 18.7 |
| 12/11/56 .. | 3 weeks | 1,555 | 1,652 | 1,906 | 1,646 | 1,972 | 16.9 |
| 13/11/56 .. | fertilized | | | | | | |
| 29/12/56 .. | 6 weeks | 1,212 | 1,415 | 1,761 | 1,382 | 3,118 | 14.8 |
| Total .. | 17 weeks | 4,274 | 5,711 | 5,961 | 6,525 | 8,248 | |

O = control
N = 300 lb./ acre sulphate of ammonia
P = 200 lb./ acre triple superphosphate
K = 100 lb./ acre muriate of potash

Clippings for all grass work were initially scheduled to be done every three weeks. However this time interval does not allow the grass to overshadow the weeds enough to compete with them. The clipping at the end of the 6—week period indicates that both N and P are required if yields are to be maintained. Previous experience has shown sweet grass to be a heavy feeder upon nitrogen.

The yield of D.M./ acre (8,000 lb/acre in 17 weeks) when given a full fertilizer dressing promises to be about three times the annual production from natural savanna. However, sweet grass is extremely palatable and care must be exercised during grazing so that (*a*) it is not grazedout completely (*b*) it is given complete rest to allow recovery *i.e.* rotational grazing.

(B) Pangola Grass: (digitaria decumbens): Various trials have been started in the second half of 1956 using 7 levels of phosphate application. As with sweet grass, clippings were initiated at 3—week intervals, but at the end of the year the increasing thinness and decreased production of some of the experimental areas led to the interval being increased to 6 weeks. Immediately after each clipping, a general dressing is given of 50 lb./ acre of sulphate of ammonia (*i.e.* approximately 400 lb./ acre/annum).

All that can be said about the results to date is that, except on the Puletan soils (pine ridge), there are no significant responses to various phosphate levels so far. The following production has been obtained:

Stann Creek (Stopper sandy clay —6,850 lb. D.M./ acre in 15 weeks
Central Farm (Barton silty clay) —7,560 lb. D.M./ acre in 18 weeks
% D.M. = approx. 16.5%

III. *Introduction Plots*:

(A) Pensacola Bahia (*Paspalum notatum*). Grows very slowly on this clay soil. Tillers but does not put out the rhizomes seen on better drained alluvial soil.

(B) Blue Panic: (*Panicum antidotale*) Grows 4—6 ft. high with narrow but soft leaves. A rapid grower. Seeds at all times of the year but the seed is not always viable.

(C) Rhodes Grass: (*Chloris gavana*). Grows slowly to about 18″ high and appears to be somewhat fibrous. Erect inflorescences produced at all times of the year on stalks about 36″ high. Seeds appear to be viable. Does not tiller much. Has maintained growth into the dry season. Is beginning to combine well with kudzu.

(D) Sweet Grass: (*Ixophorus unisetus*): The most aggressive grass on this black clay. Mixtures with other grasses (Buffel, Molasses, Blue Panic) have all become 100% Sweet grass. A rapid grower which seeds readily. Also propagated by stem cuttings which root at the node. Seems to be very palatable and low in fibre.

(E) Broad-leaved Guinea Grass: (*Panicum Maximum*): A selection made locally. Leaves are three times as broad as normal guinea grass, and are borne all the way up the stem rather than rising from the base.

(F) *Ischaemum sp. II*: A prostrate grass which grows fast to give a dense close sward 6—8″ high. Puts up inforescences 12—18″ high at all times of year. Viable seed. Seems to grow well after cutting.

(G) *Ischaemum sp. II*: A finer leaved, slower-growing type than sp. 1.

(H) Buffel Grass: (*Pennisetum ciliare*). Grows rapidly during the hotter months to a height of 4—6 ft. During the cooler months it grows only 2—3 ft. high and obviously needs fertiliser to maintain its growth. At certain times of the year it will root at the nodes. Low in fibre. In the hot months tends to be viviparous: the seed in the cool months is not always immediately viable. Should not be allowed to get too old before cutting as it is slow to return.

(I) Molasses Grass: (*Melinis minutiflora*). Grows strongly to form a dense sward 18″—30″ high. Gives quantities of viable seed: also propagated by stem cuttings. When cut at a mature stage it is comparatively slow to come back.

(J) *Centrosema pubescens*: Forms a dense but low mat. Appears that it will give seeds during the dry season.

(K) Tropical Kudzu: (*Pueraria thumberginna*) continues to be difficult to establish. After a month or more it picks up and grows strongly. Looks as though it might combine well with sweet grass, Rhodes grass and other erect types.

(L) Lucerne (*Medicago sativa*). Grows poorly in the cool months and hardly at all in the hot months.

(M) Velvet beans: (*Mucuna pruriens*) Grows well and form a dense cover highly suitable for a cover drop.

(N) Sword beans: (*Canavalia ensiformis*) Forms a good cover, although not as dense as velvet beans. Seeds viable although liable to crack when dried.

## Sugar Cane

(*i*) *Germination Trial* (Caledonia)

POJ 2878 planted on 17th December 1955 was given the following treatment:—

A = Tops with 3 buds
B = Tops with 6 buds
C = Midpieces with 3 buds
D = Midpieces with 6 buds
I = Cut and planted direct
II = Soak in water overnight
III = Dip setts in a slurry of Agrosan (1 lb. in 10 gals. water)
IV = Soak in Agrosan overnight.

The object was to attempt to increase germination and so establish cane more quickly and reduce weed competition. The number of plants germinated after 90 days were:—

TABLE 8

| *Treatment* | *A* | *B* | *C* | *D* | *I* | *II* | *III* | *IV* |
|---|---|---|---|---|---|---|---|---|
| mean .. .. | 48 | 79 | 40 | 46 | 29 | 87 | 43 | 54 |
| S.S. .. .. | 846 | 6,942 | 972 | 1,224 | 23 | 4,692 | 1,155 | 342 |
| D.F. .. .. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| S.D. .. .. | 16.8 | 48.1 | 18 | 22 | 2.8 | 39.6 | 19.6 | 10.6 |

Treatments A, B, C and D are not significantly different.
Treatments II and IV are significantly better than treatment I.
Treatment III is not significantly better than treatment I.

TABLE 9

| | *All plots soaked in Agrosan or water* | *All plots not soaked* |
|---|---|---|
| Mean .. .. .. .. | 70 | 36 |
| S.S. .. .. .. .. | 7,318 | 1,570 |
| D.F. .. .. .. .. | 7 | 7 |
| S.D. .. .. .. .. | 32.3 | 14.9 |

Soaked plots have a significantly better germination than plots not soaked.

Conclusions:—1) Although tops with 6 buds appear to give increased germination, the increase is not singificant.

2) The trial is not randomised to take out soils differences with respect to treatments I, II, III and IV but, if no soil differences occur over the trial area, then soaking the setts overnight in water has produced a significant increase in germination at 90 days.

(*ii*) *Variety Trial.* (Caledonia.)

Harvested in July 1956 as plant cane. No fertiliser applied. Five replications in Latin Square with 1/50 acre plots.

TABLE 10

| *Variety* | | *Yield* (*tons*/acre)+*S.D.* |
|---|---|---|
| POJ | 2,878 | 20.0+7.5 |
| B | 4,098 | 19.8+3.3 |
| B | 3,337 | 24.1+3.8 |
| B | 41,227 | 13.6+3.7 |
| B | 37,161 | 10.6+3.1 |

Results of test:—

TABLE 11

| | | *B*4098 | *B*3337 | *B*41227 | *B*37161 |
|---|---|---|---|---|---|
| POJ | 2878 | | | + | + |
| B | 4098 | | | + | + |
| B | 3337 | | | | + |
| B | 41227 | | | | + |

\+ = significant at p= 0.05
++ = „ „ p= 0.01

On the basis of the harvest in 1954, and 1955 of a trial at Louisville, B34104 and B41211 were eliminated from further trial. This year's figures indicate that B3337 and B4098 are as good as POJ 2878. No variety is outstanding. There were indications during the growing season that B37161 is earlier maturing than other varieties. Further trials are being laid down, and all trials will be given optimum fertiliser dressings and cultivation so as to evaluate the varieties best able to respond to good farming.

(*iii*) *Chemical Weedicide Trial.* (San Roman.)

The sugar cane was planted by stick-drilling on August 25th 1956. The land, which had been mechanically cleared in November 1955, was in regenerating bush 3—5 ft. high. It was disced several times before planting. Even so, most of the weeds were woody (tastab, *Guettarda Combsii*; cojeton, *Thevetia Gaumeri*; chucum, *Pithecolobium albicans*; hogweed, malvaceous sp; pixoy, *Goazuma ulmifolia*; annual grasses). At the time of spraying—between 12.00 noon and 4.00 p.m. in hot sun on 27/10/56—the cane was 18—36″ high and weeds mainly 12—24″ high. Although weeds should be tackled when much smaller than this, weeds in the cane fields are commonly allowed to grow to this height before cleaning. Owing to the nature of the weeds, rather strong formulations were used:—

TABLE 12

| *Treatment* (27/10/56) | | *Damage* (22/11/56) | |
|---|---|---|---|
| Y | | *Dicots* | *Monocots* |
| P D U | 10 lb./ac | ++ | +++++ |
| Fermimine | 5 pints/ac | ++++ | ++ |
| Fermimine | 10 pints/ac | ++++ | +++ |
| Fernoxone | 7 lb./ac | +++++ | +++ |
| Fernoxone | 14 lb./ac | ++++++ | ++++ |
| Kanex | 14 lb./ac | = | ++++++ |

Number of stars indicate extent of damage to weeds, six stars representing almost complete kill.

Kanex was mixed in the proportions Kanex: diesel: water=2:3:36, and sprayed through an atomiser at approximately 21 galls. acre. All other treatments were applied at about 14 galls./acre. Both P D U and Fernoxone gave trouble by blocking the spray nozzle. Further observations were made in late December, 1956:—

(1) P D U is too expensive and has comparatively little effect on these woody dicotyledons. It has a residual effect but damages the cane unless carefully applied.

(2) Fernimine appears to be a little less effective than Fernoxone, but the latter is hardly suitable for low volume spraying. The heavy application is not notably better than the light one, but has a much greater residual effect.

(3) Kanex is very effective against monocotyledons and should form a part of every spray mixture.

Conclusions: If weeds are to be controlled by chemicals, they need to be sprayed whilst still small. Work is being done with Fernimine, Fernesta, Trioxone and Kanex to try to decide upon a suitable mixture of these. In Corozal District, the cane is often a long distance from a source of water and water conveyors are scarce: for these reasons, and to reduce costs, all spraying should be with low-volume sprays.

## Broomcorn

Following the fertilizer trial performed on Xaibe shallow clay in 1954, in which there were non-significant indications of increased yield of straw due to phosphate, brooms were made from straw harvested on the differently treated plots.

Original methods for testing the stiffness and wearability of these brooms were devised and carried out by the British Brush Manufacturers' Research Association.

Test A: (Wearability) Attempts were made to abrade the brooms, first of all by striking with wooden rods then with a wooden rubbing surface and finally with a concrete surface.

TABLE 13

| *Fertilizer* | *C* | *N* | *P* | *K* | *NP* | *NK* | *PK* | *NPK* |
|---|---|---|---|---|---|---|---|---|
| Final wt. (gms) .. | 495 | 531 | 530 | 599 | 504 | 553 | 580 | 546 |
| Waste (gms) .. | 3.7 | 6.1 | 4.9 | 5.5 | 6.3 | 6.3 | 7.9 | 7.5 |

Test B: (Stiffness) Each broom was mounted on a pendulum arm and allowed to swing from horizontal to strike a stationary bar. The height of swing-through is a measure of broom stiffness.

| | |
|---|---|
| Stiff fibre | K and NPK |
| Medium fibre | Others |
| Soft fibre | Control |

Test C: (Wearability) Rotating vanes were used to strike stationary brooms.

TABLE 14

| *Fertilizer* | *C* | *N* | *P* | *K* | *NP* | *NK* | *PK* | *NPK* |
|---|---|---|---|---|---|---|---|---|
| Original wt. (gms) | 562 | 516 | 562 | 520 | 523 | 513 | 520 | 520 |
| Waste (gms) .. | 8.7 | 5.6 | 8.8 | 8.4 | 6.3 | 6.1 | 8.6 | 8.0 |

Analysis of these figures:—

Since we are assuming that all brooms are approximately the same width, *i.e.* have the same wearing surface, it is better to take figures for absolute wastage than wastage %.

TABLE 15

| *Plots containing* | *Average wastage (gms.)* | | | | | |
|---|---|---|---|---|---|---|
| | *No. P* | *P* | *No.K* | *K* | *No. PK* | *PK* |
| Test A .. .. | 5.4 | 6.7 | 5.3 | 7.1 | 5.5 | 7.7 |
| Test C .. .. | 7.2 | 7.9 | 7.4 | 7.8 | 7.3 | 8.3 |

| | *% increase in wastage* | | |
|---|---|---|---|
| | *due to P* | *due to K* | *due to PK* |
| Test A .. .. | 24 | 34 | 40 |
| Test C .. .. | 10 | 6 | 14 |

Samples of brooms made from straw grown on this land have been in constant use by housewives at Central Farm for several years, and have been found to be very hard-wearing. The present market in Belize demands a very stiff broom without regard to wearing ability. Now, the stiffer the broom, the quicker it will wear out. Consequently, brooms with a high wastage rate are the most popular.

Most of the soils used for growing broom-straw are defficient in phosphate. It would appear that both straw yield and broom stiffness benefit from phosphate, whilst potash has a further beneficial effect upon stiffness. An economic application at present, however, would be p—20—0 at 100 lb./ acre.

### Pineapples (Central Farm)

In an attempt to obtain a correlation between the weight of fruit at harvest and the number of leaves of sugar loaf pineapples growing on old alluvial soil, 232 yielding pineapple plants were used. The results indicate that there is a small positive correlation.

$$r=0.383$$

Although the points showed fiar scatter when plotted, the correlation is highly significant as shown by a test.

$$t, \text{ by calculation} = 6.84$$
$$t = 2.57 \quad (n\%232,\ P=0.01)$$

The relationship between fruit weight and No. of leaves is given by

$$y = 1.074\,x + 4.613$$

where $y$ = weight of fruit in ozs.
$x$ = no. of leaves.

It is felt that closer correlation would be obtainable if the fruit were all cut with exactly the same length of stem at the same stage of ripeness.

### Rice

A fertiliser trial was performed with BG 79 under controlled water conditions at Toledo Agricultural Station. The nurseries were sown 26/5/56 and transplanting done 12—19/7/56. Harvest was 178—184 days after sowing.

*Treatments were*:—

| | |
|---|---|
| N | 200 lb. sulphate ot ammonia/ac. |
| P | 100 lb. triple super/ac. |
| K | 89 lb. muriate of potash/ac. |

| *Yields*:— | | | | |
|---|---|---|---|---|
| | O | 2,868 | + | 1,289 lb. padi/acre |
| | NP | 3,896 | + | 1,482 |
| | P | 4,731 | + | 1,080 |
| | N | 4,843 | + | 1,467 |
| | K | 5,006 | + | 1,378 |
| | NPK | 5,759 | + | 805 |

TABLE 16

| | *K* | *N* | *P* | *NP* | *O* |
|---|---|---|---|---|---|
| NPK | xx | xx | xx | xx | xx |
| K | | | x | xx | xx |
| N | | | | xx | xx |
| P | | | | xx | xx |
| NP | | | | | xx |

x sign. at p = 0.05 level
xx sign. at p = 0.01 level

*Economics*:—

| | | |
|---|---|---|
| Valuing | Sulphate of Ammonia at | 5¢/lb. |
| | Triple super | 7¢ |
| | Muriate of Potash | 6¢ |

| DISTRICTS AND STATIONS | January | February | March | April | May | June | July | August | September | October | November | December | Total 1956 | Total 1955 | Average 10 Yrs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COROZAL** | | | | | | | | | | | | | | | |
| Corozal Town | .39 | 1.62 | 1.28 | .13 | 5.26 | 8.30 | 4.02 | 2.25 | 12.99 | 6.88 | .72 | 3.78 | 47.62 | 41.57 | 49 44 |
| Corozal Agstat | .35 | 1.13 | 1.28 | 0 | 5.43 | 8.63 | 4.71 | 2.37 | 12.67 | 3.08 | .94 | 1.94 | 42.53 | 47.11 | 50.52 |
| Louisville | — | 1.73 | .99 | 0 | 6.81 | 10.67 | 4.68 | 5.37 | 8.42 | 6 30 | 1.09 | 5.33 | 51.39 | 66.45 | 60.52 |
| Pembroke Hall | .20 | 2.06 | .81 | 0 | 8.07 | 11.17 | 4.49 | 2.93 | 9.44 | 3.12 | .74 | 5.39 | 48.42 | — | |
| **ORANGE WALK** | | | | | | | | | | | | | | | |
| Orange Walk Town | .22 | 2.24 | .61 | 0 | 2.11 | 9.86 | 7.38 | 3.94 | 6.60 | 5.13 | 1.98 | 3.32 | 43.39 | 49.26 | 59 00 (c) |
| Gallon Jug | .37 | 5.37 | — | 0 | 7.12 | 12.92 | 12.30 | 5.50 | 6.80 | 6.33 | 2.56 | 5.88 | 65.15 | 72 41 | 59 89 (A) |
| Freshwater Creek | .69 | .91 | 2.40 | 0 | 16.91 | 28.91 | 22.06 | 2.50 | 27.26 | 12.36 | 7.35 | 4.71 | 126.06 | 85.51 | 98.20 (c) |
| August Pine Ridge | .87 | .77 | .80 | 0 | 1.85 | 10.65 | 6.85 | 5.25 | 8.15 | 3.75 | 1.05 | 4.15 | 44.15 | 62.36 | |
| Orange Walk Agstat | | | | | | | | | | | | | | | |
| Hill Bank | NEW STATION | | | | | 11.59 | 6.01 | 4.01 | 6.49 | 4.50 | 3 10 | 5.38 | — | — | |
| **BELIZE** | | | | | | | | | | | | | | | |
| Salt Creek | .96 | 1.83 | 1.31 | 0 | 7.82 | 17.99 | 4.61 | 4.75 | 9.10 | 8 29 | 2.94 | 8.37 | 68.87 | 74.86 | |
| Belize | 1.60 | 2.57 | 1.34 | .01 | 9.19 | 22.32 | 5 62 | 5.95 | 11.30 | 14.51 | 4.71 | 11.79 | 90.91 | 96.38 | 69.75 |
| Gracie Rock | .90 | 3.54 | 1.04 | .06 | 10.05 | 18 35 | 10.01 | 3.67 | 14.35 | 9.25 | 6.70 | 9.73 | 87.65 | 92 31 | 81 47 (c) |
| Maskall | .79 | 1.89 | 1.79 | .10 | 7.60 | 15.96 | 7.15 | 2 96 | 8.73 | 8 07 | 3.14 | — | 58.18 | 72 60 | |
| San Pedro | .58 | 1.07 | 3 26 | .05 | 4.08 | 10.27 | 3.29 | 1.23 | 6.91 | 14 25 | 4.13 | 9 79 | 58.91 | — | |
| Stanley Field | .97 | 2.82 | — | 0 | — | 16.13 | 7 96 | 3.78 | 11.62 | 9 62 | 5.69 | 9.00 | 67.59 | 82.98 | |
| Lucky-Strike | 38 | .59 | 1.69 | 0 | 6 85 | 22.71 | 8 57 | 2.47 | 9.52 | 9.31 | 3.09 | 8.31 | 73.49 | 63.18 | |
| Mussel Creek | .94 | 1.49 | 2.19 | .01 | 5.92 | 17.43 | 12.16 | 4.87 | 9.92 | 7.46 | 4.86 | 7.96 | 75.21 | 72.95 | |
| Glenville | 1.99 | 4.21 | .70 | 0 | 11.56 | 12.40 | 11.90 | 4.63 | 12.37 | 7 59 | 3.41 | 5 96 | 76.72 | 89 58 | |
| **CAYO** | | | | | | | | | | | | | | | |
| Central Farm | 1.22 | 3.70 | 1.40 | .03 | 7.54 | 9.41 | 7.19 | 5 05 | 5 19 | 8.67 | 4.57 | 7.40 | 61.37 | 63.63 | 53.85 |
| Cayo Town | 1.23 | 2.10 | 1.18 | 0 | 3.99 | 10.50 | 5 88 | 5 83 | 6.90 | 7 24 | 5.40 | 6.26 | 56.51 | 51.60 | 44.10 (c) |
| Augustine | .87 | 3 47 | .43 | 0 | 3.42 | 9.14 | 7.22 | 4.84 | 9.30 | 9 36 | 4 74 | 7 69 | 60.48 | 60.53 | 65.37 (A) |
| Listowel | 1.18 | 3 08 | 1 86 | .02 | 5.95 | 10.03 | 10.52 | 5 52 | 5.15 | 8.49 | 3.86 | 4.46 | 60 12 | 60.02 | 58.81 (c) |
| Benque Viejo | 1.06 | 1.13 | 1.63 | 0 | 3.32 | 11.77 | 10.75 | 2.88 | 10 69 | 6.45 | 3.72 | 5 29 | 58.69 | 51 28 | 53.49 (c) |
| Roaring Creek | 2.78 | 3.11 | .03 | 1.08 | 7.47 | 15.17 | 18.70 | 7.25 | 9.64 | 7.55 | 5.20 | 9.82 | 88.07 | 92 36 | |
| Norland | 1.43 | 3.14 | 1.45 | 0 | 6.32 | 10.21 | 6.06 | 4.93 | 4.88 | 7.61 | 4.12 | 7 20 | 57.35 | 67.57 | |
| Millionaire | | | | — | 2.36 | 7 51 | 8.99 | 3.96 | 8.75 | 7.22 | 1.31 | 10.94 | 51.04 | — | |
| Sibun Camp | | | | | — | — | — | 9.08 | 13.13 | 10.53 | 7.22 | 10 63 | 50.59 | — | |
| Never Delay | NEW STATION | | | | 5.24 | 17.71 | 15.84 | 6.58 | 13.90 | 10.28 | 6 43 | — | 75.98 | — | |
| Caves Branch | NEW STATION | | | | 10.68 | 18 87 | 20.19 | 8.49 | 9.24 | 12.57 | 7.16 | 9.09 | 96.29 | — | |
| **STANN CREEK** | | | | | | | | | | | | | | | |
| Stann Creek Town | 1.57 | 2.18 | 3.01 | — | — | 10.78 | 5.41 | 3.78 | 9.08 | 11.82 | 6.21 | 11.50 | 65.34 | 52.41 | 78 61 |
| Stann Creek Agstat | 2.01 | 3.25 | 1.97 | .03 | 7.03 | 28.33 | 9.12 | 2.85 | 10.75 | 13.77 | 7.71 | 7.41 | 94.23 | 101.75 | 81 75 |
| False Creek | 0 | 7.49 | 2 52 | .05 | 15.60 | 26 30 | — | — | — | 12.52 | — | — | 64.48 | 116.11 | 46.71 (c) |
| Cow Creek | 4.14 | 4.89 | 2.59 | .06 | 17 98 | 32.07 | 11.80 | 8 65 | 16 02 | — | 6.47 | 13.03 | 117.70 | 122.34 | |
| Alta Vista | 4.08 | 7.58 | 2.40 | .75 | 18.86 | 26.80 | 14.01 | 4.24 | 15.52 | 11.94 | 6.53 | 9.97 | 122.68 | 117 60 | |
| Middlesex | 2.25 | 3.35 | 1.40 | .10 | 17.69 | 27.34 | 14.95 | 10.19 | 17.29 | 9.52 | 6.64 | 9.08 | 119.80 | 121.24 | |
| Melinda | 1.35 | 4.39 | 2.78 | .26 | 7.72 | 25.80 | 6.30 | 4.16 | 19.95 | 15.80 | 6.28 | 12.31 | 107.10 | 107 69 | 47.12 (c) |
| Pomona | 2.69 | 2.45 | 2 54 | .05 | 10 33 | 26 46 | 9.78 | 4 19 | 10.36 | 12 53 | 5.96 | 9.46 | 96.80 | 114.90 | 47.74 (c) |
| Mango Creek | 2.40 | .85 | 5.28 | 2.04 | 6.47 | 40 02 | — | 9.91 | 13.44 | 9.28 | 5.26 | 8.73 | 103.68 | 103 12 | 47.46 |
| New Farm | 4.59 | 5.43 | 2.93 | .71 | 18.64 | 32.53 | 12.35 | 9.21 | 16.55 | 13.13 | 6.94 | 13.89 | 136.90 | 133.79 | |
| Kendal | 5.56 | 4.42 | 2.20 | .26 | 9.09 | 43.86 | 9.42 | — | 14.59 | 9 93 | 9.63 | 7.05 | 116.01 | — | |
| **TOLEDO** | | | | | | | | | | | | | | | |
| Punta Gorda Town | 8.59 | 3.02 | 3.28 | 2.53 | 18.54 | 24.56 | 23.51 | 26.83 | 17.53 | 9.63 | 8.69 | 10.84 | 157.55 | 137.29 | 154.00 |
| Punta Gorda Agstat | 7.60 | 2 37 | 2.10 | 3.00 | 16.32 | 24.43 | 28.07 | 22.96 | 20.64 | 6.56 | 8.38 | 7.92 | 150.35 | 137.97 | 146.48 |
| San Antonio | 3.40 | 3.49 | 2.02 | .22 | 14.15 | 15.96 | 19.52 | 15.85 | 17.48 | 11.18 | 5.29 | 11.54 | 120.10 | 110.77 | |
| Barranco | 7.99 | 3.72 | 4.88 | 4.31 | 33.37 | 30.91 | 22.84 | 29.21 | 20.23 | 9.98 | 5.77 | 12.41 | 185.62 | 151.33 | |
| Machaca Camp | Opened in March | | 1.30 | 1.08 | 16.02 | 18.52 | 33.52 | 19.76 | 22.61 | 7.99 | 7.24 | 9.12 | 137.16 | — | |
| Monkey River | Opened in May | | | | 8.01 | 25.93 | 6.59 | 12 37 | 10.09 | 9.47 | 6.46 | 14.71 | 93.63 | — | |
| Crique Sarco | 6.30 | 4.65 | 3.31 | 1.39 | 40 05 | 34.02 | 48.62 | 38.42 | 19.95 | 12.75 | 5.52 | — | 214.98 | 139 49 | |

APPENDIX I (*Continued*)

| MONTH | PRESSURE | | | TEMPERATURE | | | | | | | | HUMIDITY | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEAN BAROMETIC PRESSURE | | | MEAN MONTHLY MAXIMUM | | | | MEAN MONTHLY MIXIMUM | | | | MEAN MONTHLY RELATIVE HUMIDITY | | | | |
| | Belize | Stann Creek | Toledo | Belize | Staun Creek | Toledo | Central Farm | Belize | Stann Creek | Toledo | Central Farm | Belize | Stann Creek | Toledo | Central Farm | Musse Creek |
| January | 30.04 | 29 99 | 29.92 | 79 | 79 | 74 | 75.2 | 65 | 62 | 58 | 67 | 91% | 71% | 82% | 88% | 92% |
| February | 29.99 | 29.94 | 29.90 | 84 | 82 | 83 | — | 72 | 69 | 64 | 79 | 89 | 75 | 79 | 79 | 94 |
| March | 30.01 | 29.99 | 29.76 | 86 | 82 | 84 | — | 71 | 68 | 60 | 76 | 83 | 71 | 77 | 81 | 82 |
| April | 29.95 | 29.87 | 29.81 | 89 | 88 | 87 | — | 73 | 70 | 63 | 78 | 78 | 70 | 71 | 79 | 75 |
| May | 29.96 | 29 88 | 29 84 | 89 | 87 | 85 | — | 73 | 72 | 70 | 80 | 85 | 68 | 77 | 89 | 78 |
| June | 29.95 | 29.89 | 29.80 | 86 | 84 | 84 | — | 75 | 70 | 71 | 78 | 85 | 81 | 83 | 84 | 87 |
| July | 30.03 | 29.90 | 29.86 | 89 | 86 | 85 | — | 73 | 68 | 70 | 79 | 81 | 76 | 82 | 83 | 85 |
| August | 29.99 | 29.91 | 29.82 | 90 | 88 | 86 | — | 74 | 72 | 70 | 81 | 81 | 72 | 81 | 82 | 85 |
| September | 29.93 | 29.89 | 29.75 | 89 | 88 | 86 | — | 73 | 72 | 70 | 79 | 83 | 76 | 84 | 83 | 88 |
| October | 29.99 | 29 91 | 29.79 | 87 | 87 | 85 | 84 | 73 | 69 | 68 | 78 | 82 | 78 | 84 | 84 | 89 |
| November | 30.04 | 30.00 | 29.88 | 84 | 83 | 81 | 82 | 69 | 66 | 63 | 73 | 87 | 78 | 84 | 73 | 87 |
| December | 30.05 | 30.05 | 29.87 | 82 | 83 | 79 | 74 | 76 | 66 | 66 | 69 | 91 | 82 | 92 | 87 | 90 |

APPENDIX II

## AGRICULTURAL COMMODITY IMPORTS 1954 1955 AND 1956

### CUSTOMS DEPARTMENT FIGURES

| Commodity | Unit | 1954 | | 1955 | | 1956 | |
|---|---|---|---|---|---|---|---|
| | | Quantity | Value | Quantity | Value | Quantity | Value |
| | | | $ | | $ | | $ |
| Cattle for Breeding | No. | 54 | 30,216 | 40 | 14,382 | 15 | 11,861 |
| Cattle for Slaughter | No. | — | — | 13 | 1,339 | 4 | 500 |
| Poultry | No. | 7 246 | 2,452 | 6,764 | 1,662 | 6,861 | 5,655 |
| Swine for Breeding | No. | 9 | 921 | — | — | — | — |
| Butter | x 100 lb. | 1,530 | 123,807 | 1,944 | 157,901 | 800 | 64,077 |
| Butter Substitutes | x 100 lb. | 3.984 | 121,843 | 3,611 | 105,267 | 4,313 | 114,966 |
| Cheese | x 100 lb. | 1,646 | 91,437 | 2,381 | 127 750 | 1 923 | 104,030 |
| Cocoa, prepared | x 100 lb. | 383 | 29 553 | 484 | 37,023 | 348 | 34,934 |
| Coffee— ground | x 100 lb | 194 | 26,332 | 293 | 44,489 | 227 | 37,686 |
| substitutes | x 100 lb. | 54 | 14.193 | 1 | 74 | 8 | 1 079 |
| Eggs, fresh | x doz. | 9,756 | 7,609 | 22,013 | 16,375 | 44,340 | 28,028 |
| Fish, canned or bottled | 100 lb. | 761 | 30,058 | 937 | 36,229 | 738 | 27,665 |
| Rice | x 100 lb. | 36.642 | 423 811 | 26,640 | 179,167 | 3,424 | 21,083 |
| | | | | | | 26 208 | 282,012 |
| Flour | x 100 lb. | 87,758 | 605,150 | 111,601 | 727,836 | 102 084 | 610,155 |
| Dried Beans, Red Kidney | x 100 lb. | 966 | 17,408 | 1,026 | 22,186 | 210 | 4,184 |
| Other kinds | x 100 lb. | 1,164 | 18,337 | 1,561 | 23,700 | 6,850 | 96 175 |
| Lard and Substitutes | x 100 lb. | 8 718 | 269,166 | 9,366 | 230,690 | 11,602 | 267,106 |
| Beef in Barrels | x 100 lb. | 1,459 | 55,975 | 1,649 | 52,655 | 2,261 | 60,910 |
| Pork in Barrels | x 100 lb. | 1,982 | 56 423 | 1,926 | 64,302 | 2,434 | 70,648 |
| Meat canned or bottled | x 100 lb. | 1,762 | 96,819 | 2,771 | 141,627 | 3,227 | 139,672 |
| Hams and Bacon | x 100 lb. | 340 | 28,611 | 652 | 54,700 | 662 | 49,603 |
| Milk— Condensed | x 100 lb. | 20,872 | 440,743 | 22,163 | 499,977 | 24,789 | 559,278 |
| Unsweetened | x 100 lb. | 4,193 | 104,296 | 11,089 | 212 169 | 5,053 | 109,402 |
| Powdered | x 100 lb A | 1,138 | 37 321 | 3,799 | 137 197 | 7 051 | 191 709 |
| Sugar—Refined | x 100 lb. | 12,193 | 105,758 | 9 643 | 65,845 | 18 117 | 137,442 |
| Spices | x 100 lb. | 139 | 12,307 | 236 | 18,390 | 153 | 10 473 |
| Vegetables— Onions | x 100 lb. | 4,585 | 34,224 | 4,966 | 40,260 | 4,923 | 43,907 |
| Potatoes | x 100 lb. | 7,431 | 48,563 | 10,312 | 69,778 | 6,993 | 59 375 |
| Garlic | x 100 lb. | 164 | 5,136 | 183 | 4,195 | 107 | 1.977 |
| Other Fresh | x 100 lb. | 878 | 10,541 | 1,094 | 16,767 | 926 | 13,006 |
| Canned or bottled | x 100 lb. | 1,108 | 25.434 | 1,702 | 39,782 | 1,702 | 37,956 |
| Tobacco—Unmanufactured, Blackleaf | lb. | 31,340 | 24 407 | 39 427 | 32,665 | 31,395 | 27,831 |
| Other | lb. | 74,092 | 65,890 | 54,166 | 54,538 | 64 903 | 47,556 |
| Cigarettes | lb. | 41,249 | 100,039 | 60,952 | 147,170 | 50,400 | 116 886 |
| Bananas | Bunches | 985 | 513 | 20,873 | 33 930 | 47 154 | 73 258 |
| Plantains | Bunches | 1,477 | 386 | 49 | 22 | 4,699 | 2,313 |
| Citrus— Grapefruit fresh | x 100 lb. | 24,474 | 106,024 | 29,495 | 117,172 | 13,933 | 55,087 |
| Grapefruit juice | x 100 lb. | 29,942 | 273,888 | 31,557 | 289 989 | 30,782 | 300,600 |
| Grapefruit segments | x 100 lb. | 42,259 | 552,212 | 35,223 | 441,507 | 61,643 | 1,009,037 |
| Grapefruit concentrate | x 100 lb. | 1,649 | 39,215 | 395 | 9,046 | 2,761 | 75,666 |
| Grapefruit oil | x 100 lb. | 62 | 12,456 | 74 | 12,280 | 51 | 13,038 |
| Oranges, fresh | x 100 lb. | 4.378 | 3,954 | 153 | 295 | 1,955 | 6,261 |
| Oranges, concentrate | x 100 lb. | 778 | 32,005 | 45 | 1,350 | 1,110 | 298,110 |
| Orange, juice | x 100 lb. | 9,491 | 91,032 | 8,133 | 75,637 | 40,765 | 598,063 |
| Orange, oil | x 100 lb. | 49 | 4,691 | 95 | 6,128 | 273 | 19,501 |
| Pineapple, canned | x 100 lb. | 1,182 | 20,396 | 379 | 8,588 | — | — |
| Other fresh fruit | x 100 lb. | 137 | 295 | 86 | 295 | 873 | 2 802 |
| Fruit pulp | x 100 lb. | — | — | 617 | 3,970 | 2,569 | 18,041 |
| Dried Beans, Red Kidney | x 100 lb. | 46 | 644 | 1.353 | 24,367 | 360 | 7,920 |
| Vegetables, other | x 100 lb. | 57 | 308 | 5 | 20 | 52 | 527 |
| Spices, Anatto | x 100 lb. | 8 | 157 | — | — | — | — |
| Maize (Whole grain corn) | x 100 lb. | 26,585 | 104,055 | 9,271 | 36,452 | 125 | 605 |
| Sugar, unrefined | x 100 lb. | 20,258 | 145,332 | 46,567 | 333,751 | 41,619 | 298,310 |
| Eggs fresh | x doz. | 381 | 164 | 67 | 41 | — | — |
| Coconuts | x 100 nuts | 20,809 | 118,110 | 18,248 | 96 252 | 4,311 | 24,540 |
| Copra | x 100 lb. | 3,972 | 53,153 | 1 917 | 16,975 | 3,440 | 29,818 |
| Cohune—Kernels | x 100 lb. | 3,097 | 38,198 | 5,378 | 48,353 | 5,164 | 46,663 |
| Ramie, fibre | x 100 lb. | 64 | 2,523 | 382 | 10,283 | — | — |
| Alligator Skins | lb. | 5,302 | 15,498 | 13 681 | 34,562 | 6,907 | 21,536 |
| Fish— Fresh | lb. | 67.712 | 17,434 | 25,985 | 4,782 | 33 536 | 5 086 |
| Dried | lb. | 75,927 | 17,385 | 33,369 | 7 318 | 56,090 | 11 797 |
| Lobsters—Whole | lb. | 97,941 | 31 231 | 60,865 | 16,610 | 34,388 | 8,141 |
| Tails | lb. | 94,246 | 75,057 | 80,595 | 74 166 | 125 171 | 116,661 |
| Conch | lb. | 3,930 | 503 | 24,578 | 3,862 | 16,300 | 1,927 |
| Tortoise shell | lb. | 663 | 1,261 | 1,367 | 2,956 | 1,572 | 3,716 |
| Shrimps | lb. | 3,475 | 1918 | — | — | — | — |

| *Section and Post* | *Name* | *Place stationed* | *Emoluments met from* | *Remarks* |
|---|---|---|---|---|
| *Headquarters, Central Farm* | | | | |
| Director of Agriculture | J.W.D. GOODBAN | Central Farm | Local Budget | On leave trom 7.6.56. Transferred Sierra Leone on 29.11.56. |
| Senior Agricultural Officer | A. N. C. THOMAS | ,, ,, | Local Budget | Appointed 28.2.56 Acting Director ofAgriculture from 7.6.56. |
| Assistant Secretary | E. P. BRADLEY | ,, ,, | C.D. & W. | Appointed 1.11.56 |
| 1st. Class Clerk | R. E. RAMIREZ | ,, ,, | Local Budget | |
| Accountant | L. A. ROBATEAU | ,, ,, | C.D. & W. | 2nd. Class clerk seconded. |
| Assistant Accountant | B.J.D. Mahler | ,, ,, | C.D. & W. | 2nd. Class clerk seconded. |
| 2nd. Class Clerk | H. J. Hoy | ,, ,, | Local Budget | |
| 2nd. Class Clerk | K. E. RICHARDSON | ,, ,, | Local Budget | |
| Typist, Grade I | Miss C. L. MCFIELD | ,, ,, | C.D. & W. | |
| Temporary Typist | Miss R. A. CATTOUSE | ,, ,, | Local Budget | |
| *Farm Manager Central Farm* | | | | |
| Farm Manager | I. S. HAZELL | Central Farm | C.D. & W. | |
| Foreman Mechanic | R. E. JEX | ,, ,, | Local Budget | |
| Senior Mechanic | W. A. SAUNDERS | ,, ,, | Local Budget | |
| Storekeeper Recorder | S. B. DANIELS | ,, ,, | C.D. & W. | |
| Farm Accounts Clerk | H. E. Lightburn | ,, ,, | Local Budget | |
| *Agricultural Chemist* | | | | |
| Agricultural Chemist | D. H. ROMNEY | Central Farm | C.D. & W. | |
| Temporary Farm Demonstrator | W. T. EBANKS | ,, ,, | ,, | To Jamaica on 3.12.56 for training in soil Survey work |
| Laboratory Assistant | H. W. FORD | ,, ,, | C. D. & W. | |
| *Experimental Officer* | | | | |
| Experimental Officer | V. E. VIAL | ,, ,, | C.D. & W. | On leave from 25.2.56. Resigned 15.8.56. |
| Temporary Farm Demonstrator | G. H. BATTY | ,, ,, | ,, | |

## STAFF LISTS—*continued*

| *Section and Post* | *Name* | *Place stationed* | *Emoluments met from* | *Remarks* |
|---|---|---|---|---|
| *Animal Health Officer* | | | | |
| Animal Health Officer | Vacant | Central Farm | C.D. & W. | |
| Livestock Officer | S. S. DALE | ,, ,, | ,, | Performed duties of Agricultural Officer, Cayo. |
| Livestock Assistant | W. J. BAEZA | ,, ,, | ,, | Farm demonstrator, seconded. |
| *Agricultural Education Officer* | | | | |
| Agricultural Education Officer | C. A. S. Hyman | ,, ,, | ,, | |
| Clerk-Handyman Assistant | L. A. Marin | ,, ,, | ,, | |
| *Land Clearing Engineer* | | | | |
| Land Clearing Engineer | J. B. HUTCHINSON | ,, ,, | C. D. & W. | |
| *Rice Scheme* | | | | |
| Rice Officer | S. R. MORRISON | Boom Rice Station | C.D. & W. | |
| Farm Demonstrator, Grade I | C. D. W. ATKINS | Boom Rice Station | Local Budget | |
| Mechanic | N. J. PATNETT | Boom Rice Station | C.D. & W. | |
| *Tobacco Scheme* | | | | |
| Tobacco Officer | C. L. WANROOY | Orange Walk | C.D. & W. | On leave from 30.5.56. Resigned 24.10.56. |
| Temporary Farm Demonstrator | L. B. FLORES | Orange Walk | C.D. & W. | |
| *Northern Districts* | | | | |
| Agricultural Officer | S. J. WILLIAMS | Orange Walk | Local Budget | |
| Agricultural Officer | E. G. RUSSELL | Corozal | Local Budget | On study leave from 1.8.53. |
| Senior Farm Demonstrator | F. F. ORIO Sr. | Orange Walk | Local Budget | |
| Senior Farm Demonstrator | P. B. Lizarraga | Corozal | Local Budget | |

| *Section and Post* | *Name* | *Place stationed* | *Emoluments met from* | *Remarks* |
|---|---|---|---|---|
| Temporary Farm Demonstrator .. .. | .. E. F. BAUTISTA | Hillview | C.D. & W. | To. E.C.F.I. Trinidad on 5.7.56 for one year training course. |
| Temporary Farm Demonstrator .. .. | .. L. B. FLORES | Orange Walk | C.D. & W. | |
| Temporary Farm Demonstrator .. .. | .. J. D. GONZALEZ | Orange Walk | C.D. & W. | |
| Farm Demonstrator Grade I .. .. | .. A. J. LIZAMA | Louisville | Local Budget | E.C.F.I. training course Trinidad 14.6.55 to 18.6.56 |
| Temporary Farm Demonstrator .. .. | .. C. TORRES | Yo Creek | C.D. & W. | |
| Foreman .. .. .. .. .. | .. H. C. BENNETT | Orange Walk | C.D. & W. | |
| Storekeeper—Recorder .. .. .. | .. MISS P. ESPEJO | Orange Walk | C.D. & W. | |
| *Veterinary Officer* | | | | |
| Veterinary Officer .. .. .. .. | .. J. H. ROBINS | Belize | Local Budget | |
| Farm Demonstrator, Grade I .. .. | .. W. A. GRANT | Belize | Local Budget | |
| *Belize District* | | | | |
| Farm Demonstrator, Grade I .. .. | .. H. S. NELSON | Boom | Local Budget | |
| Farm Demonstrator Grade I .. .. | .. I. S. STEPHENSON | Grace Bank | Local Budget | |
| Farm Demonstrator, Grade II .. .. | .. T. T. RAMOS | Ambergris Caye | Local Budget | |
| Temporary Farm Demonstrator .. .. | .. E. O. R. GILL | Freetown, Sibun River | C.D. & W. | |
| Temporary Farm Demonstrator .. .. | .. J. A. SANTOS | Lucky Strike | C.D. & W. | |
| *Stann Creek District* | | | | |
| Assistant Agricultural Officer .. .. | .. F. F. ORIO, Jr. | Agstat Stann Creek Valley | Local Budget | Six months course on Agricultural Extension Ohio State University—February to August, 1956. |
| Farm Demonstrator, Grade I .. .. | .. J. A. SWASEY | Stann Creek | Local Budget | |
| Farm Demonstrator, Grade I .. .. | .. T. L. BRACKETT | Stann Creek | Local Budget | |
| Temporary Farm Demonstrator .. .. | .. N. L. WILLIAMS | Stann Creek | C.D. & W. | Undergoing training in Trinidad, Grenada, and St. Vincent to 4.9.56. |
| Temporary Farm Demonstrator .. .. | .. A. F. THOMPSON | Stann Creek | C.D. & W. | |
| Farm Demonstrator Trainee .. .. | .. G. C. ELLIS | Stann Creek | Local Budget | |

## STAFF LISTS—*continued*

| *Section and Post* | *Name* | *Place stationed* | *Emoluments met from* | *Remarks* |
|---|---|---|---|---|
| Storekeeper—Recorder | F. J. BRADLEY | Agstat, Stann Cteek Valley | C.D. & W. | |
| Foreman | N. E. MCKENZIE | Agstat, Stann Creek Valley | C.D. & W. | |
| *Toledo District* | | | | |
| Agricultural Officer | M. K. CHOPIN | Agstat, San Antonio Road | Local Budget | |
| Temporary Farm Demonstrator | A. GENTLE | Dump, San Antonio Road | C.D. & W. | |
| Temporary Farm Demonstrator | G. C. CASTILLO | Dump, San Antonio Road | C.D. & W. | |
| Temporary Farm Demonstrator | A. P. BAUTISTA | Punta Gotda | C.D. & W. | To E.C.F.I. Trinidad on 5.7.56 for one year training course. |
| Temporary Farm Demonstrator | F. B. ARANA | Barranco | C.D. & W. | |
| Storekeeper—Recorder | C. A. WILLIAMS | Agstat, San Antonio road | C.D. & W. | |
| Foreman | J. JACOBS | Agstat, San Antonio road | C.D. & W. | |
| *Hurricane Rehabilitation Scheme* | | | | |
| Secretary Coconut Industry Board | H. P. CHARNOCK-WILSON | Belize | Hurricane Rehabilitation Scheme | Appointed 18.10 |
| Clerk Coconut Industry Board | S. C. ARZU | Belize | Hurricane Rehabilitation Scheme | Appointed 1.11.56 |
| Temporary Accountant | E. O. B. BARROW | Belize | Hurricane Rehabilitation Scheme | Appointed 16.1.56 |
| Temporary Cooperative Officer | M. AYUSO | Orange Walk | Hurricane Rehabilitation Scheme | |
| Temporary Cooperative Officer | H. BENNETT | Orange Walk | Hurricane Rehabilitation Scheme | |
| Temporary Farm Demonstrator | J. CARILLO | San Pablo | Hurricane Rehabilitation Scheme | |
| Temporary Farm Demonstrator | A. CORREA | H illview | Hurricane Rehabilitation Scheme | |
| Temporary Farm Demonstrator | S. ESCALANTE | Sarteneja | Hurricane Rehabilitation Scheme | |
| Temporary Farm Demonstrator | G. HERNANDEZ | San Estevan | Hurricane Rehabilitation Scheme | |
| Temporary Farm Demonstrator | G. TZIB | Patchakan | Hurricane Rehabilitation Scheme | |

STAFF LISTS—*continued*

| *Section and Post* | *Name* | *Place stationed* | *Emoluments met from* | *Remarks* |
|---|---|---|---|---|
| *Cayo District* | | | | |
| Agricultural Officer .. .. .. .. | .. R. S. PITT | Cayo | Loca l Budget | Appointed 29.11.56 |
| Farm Demonstrator, Grade II .. .. | .. F. BAUTISTA | Succotz | Local Budget | |
| Temporary Farm Demonstrator .. .. | .. G. I. MARIN | Cayo | C.D. & W. | |
| Temporary Farm Demonstrator .. .. | .. L. V. GABOUREL | Cayo | C.D. & W. | |

APPENDIX IV

## FINANCIAL STATEMENT 1956

### EXPENDITURE

**Head 3 Agriculture**

| | | | |
|---|---|---|---|
| Subhead | 1. | Personal Emoluments | $51,971 |
| | 2. | Travelling and Subsistence | 3,735 |
| | 3. | Transport Allowances | 1,299 |
| | 4. | Running and Maintenance Costs of Vehicles | 4,926 |
| | 5. | Revenue Producing Operations | 13,421 |
| | 6. | Running Expenses, Agricultural Stations | 21,468 |
| | 7. | Agricultural Extension Work | 1,724 |
| | 8. | Veterinary Services | 1,719 |
| | 9. | Control of Pests and Diseases | 787 |
| | 10. | Housing Rentals | 978 |
| | 11. | Implements and Tolls | 472 |
| | 12. | Visits of specialists | 578 |
| | 13. | Upkeep of Temporary Buildings | 785 |
| | 14. | Raincoats, Boots and Bags for Field Staff | 80 |
| | 15. | Boats and Doreys | 333 |
| | 16. | Upkeep of Farm Equipment | 214 |
| | 17. | Freight on Plants, etc. | 83 |
| | 18. | Scientific Equipment | 135 |
| | 19. | Stationery and Incidentals | 503 |
| | 20. | Maintenance of Central Farm | 9,850 |
| | 21. | Training Fees Agricultural Officers | — |
| | 22. | Visit of Team Agricultural Experts | 1,000 |
| | | Total Expenditure | $116,061 |

### REVENUE

**Head 4 Local Budget.**

| | | | |
|---|---|---|---|
| Subhead | 10. | Sale of Government Stores | $130 |
| | 25. | Receipts from Central Farm | 3,951 |
| | 26. | Sale of Produce and Plants, etc. Agricultural Stations | 2,665 |
| | 27. | Fees for Veterinary Officer's Services | 15 |
| | | Total Revenue | $6,761 |

**Colonial Developmeet and Welfare Schemes**

| | | |
|---|---|---|
| 981G | Completion of Central Farm (Electricity) | $ 4 |
| D9811 | Completion of Central Farm (Water Supply) | 168 |
| D1819A | Scatter Plot Trials, etc. | 527 |
| D1868A | Land Clearing Scheme | 28,308 |
| D2117A—C | Tobacco Scheme | 1,985 |
| D2376A | Soil Conservation Demontration, San Antonio | 426 |
| D2368A | Rice Investigation Scheme | 1,555 |
| D2490A | Cocoa Scheme | 337 |
| D2825 | Livestock Scheme | 3,201 |
| | Total Revenue | $36,511 |

### HURRICANE REHABILITATION PROGRAMME

| | |
|---|---|
| Emergency Measures | $20,560 |
| Recovery Plan | 112,788 |
| Agricultural Loans | 24,761 |
| | 158,109 |
| Revenue | 999 |
| | $157,110 |

**Colonial Development and Welfare Schemes**

| | | |
|---|---|---|
| D981G | Completion of Central Farm (Electricity) | $424 |
| D981H | Completion of Central Farm (Water Supply) | 2,642 |
| D1108 (377) | Training of Mr. J. A. Lizama | 1,903 |
| (378) | Training of Mr. N. L. Williams | 1,872 |
| D1366 | Minor Economic Scheme (Animal Disease Survey) | 549 |
| D1366 | Minor Economic Scheme (Guinea Grass Trail) | 501 |
| D1807 | Staff for Agricultural Department | 6,557 |
| D1808 | Agricultural Education | 1,201 |
| D1819A | Scatter Plot Trials etc. | 20,642 |
| D1868A | Land Clearing Scheme | 116,454 |
| D2117A—C | Tobacco Scheme | 25,560 |
| D2124 | Rice Officer | 3,337 |
| D2368A | Rice Investigation Scheme | 36,533 |
| D2376A | Soil Conservation Demonstration, San Antonio | 3,295 |
| D2443 | Agricultural Education | 21,663 |
| D2446A | Agricultural Staff and Buildings | 90,404 |
| D2490A | Cocoa Scheme | 15,305 |
| D2517/R663 | Cotton Investigation | 40 |
| D2651 ( 2) | Visit of Veterinary Officer to St. Vincent | 1,021 |
| D2658 (24) | Training of Mr. E. F. Bautista, E.C.F.I. | 296 |
| D2658 (25) | Training of Mr. A. P. Bautista, E.C.F.I. | 296 |
| D2658 (26) | Training of Mr. W. T. Ebanks in Jamaica | 210 |
| D2824 | Livestock Subsidy Scheme | 48,288 |
| D2825 | Livestock Scheme | 30,383 |
| R473 & D1807A | Experimental Officer | 3,062 |
| R604 | Agricultural Chemist | 1,910 |
| | Total Expenditure | $434,348 |

APPENDIX V

## LOCAL WEIGHTS AND MEASURES

1 quartio=½ almud=2½ quarts
1 almud=5 quarts
1 benequen=15 quarts
1 shushack=4 almuds=20 quarts
1 cargo=60 quarts=12 almuds.

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1 barrel=110 quarts.

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300 ears of corn in husk=60 hands
1 hand=5 ears *i.e.* the number picked up in each hand when counting ears
60 hands=300 ears=(should shell out to) 1 cargo.

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1 block chicle=1 pesada=1 arroba=25 lb.
4 pesadas or 4 arrobas=100 lb.=1 quintal.

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1 mecate=1 task—25 yards x 25 yards—approximately one-eight acre
16 mecates=1 manzana—approximately 2 acres.
(8½ varas plus 1 machete length=1 mecate).

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1 cart-load firewood—300 sticks at 3 ft. long.

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1 fathom=6 feet—1 brassada

("Brassada" is literally the distance between outstretched arms (brassos).

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CITRUS—

A unit of grapefruit is a 70 lb. box
A unit of oranges is a 90 lb. box
A/2 juice carton contains 24x12 oz. tins
A/10 juice carton contains 6 tins approx. 1 gall. each
404 juice carton contains 12x24 oz. tins
Barrels contain 43 gallons.

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4 British Honduras Dollars equal £1 Sterling.
1 British Honduras Dollar equals Five Shillings Sterling